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REPORT NO. FGT-2186
Part I
Date: 10 Sept. 1962

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# MATERIAL - GLASS CLOTH REINFORCED PLASTICS - ROOM AND ELEVATED TEMPERATURE - PROPERTIES OF

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PART I
REPORT FGT-2186
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# MATERIAL - GLASS CLOTH REINFORCED PLASTICS - ROOM & ELEVATED TEMPERATURE - PROPERTIES OF

**SUBMITTED UNDER**

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# MATERIAL - GLASS CLOTH REINFORCED PLASTICS - ROOM & ELEVATED TEMPERATURE - PROPERTIES OF

## PURPOSE:

The purpose of this investigation was to establish design allowables for glass-cloth reinforced plastics with the following fabric and resin combinations:

181 cloth with Class II (Laminac 4232) resin
181 cloth with Class III (Conolon 506) resin
181 cloth with Class IV (Epon 828) resin
143 cloth with Class II (Laminac 4232) resin
143 cloth with Class III (Conolon 506) resin
143 cloth with Class IV (Epon 828) resin
120 cloth with Class II (Laminac 4232) resin
120 cloth with Class III (Conolon 506) resin
120 cloth with Class IV (Epon 828) resin
183 cloth with Class II (Laminac 4232) resin
183 cloth with Class III (Conolon 506) resin
183 cloth with Class IV (Epon 828) resin

## SUMMARY:

Test panels of the materials listed above were produced by the Plastics Shop (Dept. 35) and the Chemistry Laboratory of the Engineering Test Laboratories. The following data and physical properties were obtained for each panel: number of plies, cure cycle, post-cure cycle, Barcol hardness, maximum and minimum thickness, resin content, dielectric constant, and dissipation factor. Panels were considered acceptable for testing if they exceeded the minimum requirements of specification MMS-0031(A) with respect to Barcol hardness, dimensional tolerances, and over-all good appearance.

Various tensile properties, including Poisson's ratio, and the bearing properties were determined for the materials listed above at room temperature, 300 and 500 F, tested at three different angles to the warp direction of the material, viz., 0, 45 and 90°. In addition, the same properties at room temperature were determined for the same materials after soaking the material in boiling distilled water for three hours. Compression properties also were to be determined, but at the date of this writing, the compression tests are incomplete. Results of the compression tests will be presented at a later date in an addendum to this report.

From each tensile specimen, the primary modulus, secondary modulus, primary proportional limit, secondary proportional limit, ultimate strength, and type of failure were determined and recorded. Bearing yield and ultimate strength and type of failure were determined for each bearing specimen. From each compression specimen, the compressive modulus and ultimate strength will be determined. In addition, two jigs and three methods of measuring compressive strain will be evaluated.

Average values obtained for Poisson's ratio were found to vary between the following limits:

Parallel to the warp direction at room temperature:

.086 for 181 cloth with Class II (4232) resin to .278 for 143 cloth with Class III (506) resin.

At 45° to the warp direction at room temperature:

.16 for 143 cloth with Class II (4232) resin to .513 for 181 cloth with Class IV (828) resin.

At 90° to the warp direction at room temperature:

.051 for 143 cloth with Class II (4232) resin to .165 for 181 cloth with Class IV (828) resin.

Parallel to the warp direction at 300 F:

.068 for 181 cloth with Class II (4232) resin to .265 for 143 cloth with Class III (506) resin.

Laminates made with 181 cloth had values for ultimate tensile strength and tensile modulus of elasticity in the warp direction which were approximately equal to these properties when tested 90° to the warp direction. These properties at 45° to the warp direction, however, were reduced by approximately 50% or more.

Laminates of 181 cloth with Class II (4232) and Class III (506) resins retained approximately 85% of their room temperature tensile properties at 500 F with the exception of laminates made with 181 cloth and Class II (4232) resin at 45° to the warp direction. Approximately 50% of the room temperature tensile properties were retained at 500 F for this condition. The room temperature ultimate tensile strength at warp directions of 0, 45, and 90° for 181 cloth with Class IV (828) resin were decreased at 500 F by 28, 44, and 23% respectively.

The ultimate tensile strength values at room temperature for laminates made with 143 cloth at 45 and 90° to the warp direction were approximately 19 and 14%, respectively, of the values parallel to the warp direction.

Soaking the above materials at 300 F while stressed to 20 and 40% of their room temperature strengths for 100 hours had no significant effect on their properties at 300 F.

All tensile specimens made of 181 cloth with Class II (4232) resin which were cut parallel to the warp direction exceeded the minimum values of specification FMS-0031(A). Five specimens of 181 cloth with Class III (506) resin and five specimens of 181 cloth with Class IV (828) resin did not meet these requirements. No other specification or comparable data are available for checking the results obtained for the other test conditions.

Bearing yield and ultimate strength were not found to vary with the direction of warp for laminates made with 181 cloth. Laminates made with 181 cloth with Class II (4232) resin and 181 cloth with Class III (506) resin retained approximately 58 and 79%, respectively, of their room temperature bearing properties at 500 F; however, a reduction of approximately 53% in the room temperature bearing properties at 300 F for 181 cloth with Class IV (828) resin was observed.

The soaking of bearing specimens of 181 cloth with Class II (4232) or Class III (506) resins at 300 F while loaded to 20 and 40% of their room temperature bearing strength for 100 hours had no significant effect on the properties at 300 F; however, similar treatments on two specimens of 181 cloth with Class IV (828) resin caused failure before 100 hours of soak time was reached.

Eight specimens of 181 cloth with Class IV (828) resin were soaked at 260 F while stressed in bearing to 20% (3 specimens) and 40% (5 specimens) of their room temperature bearing strength. One specimen loaded to 20% and four specimens loaded to 40% failed before 100 hours of soak was reached. The three remaining specimens were tested at 300 F.

The bearing properties for specimens made with 143 cloth, decreased slightly with angle of warp. However, most of these specimens tested at 45 and 90° to the warp directions did not exhibit typical bearing failures. This can be explained by the fact that this material is unidirectional. No yield was obtained for some of these specimens because failure occurred before the bearing hole deformed to .0075". In these cases, deformation at failure was recorded.

MATERIAL - GLASS CLOTH REINFORCED PLASTICS -

ROOM & ELEVATED TEMPERATURE - PROPERTIES OF

OBJECT:

The object of this investigation was to determine the mechanical properties at room and elevated temperatures for various glass-fabric and resin combinations of plastic laminated materials. The following combinations were tested: 120 cloth, 143 cloth, 181 cloth, and 183 cloth with Class II, Class III, and Class IV resins, as specified in FMS-0031(A), at 0, 45, and 90° to the direction of warp of the material. The properties to be determined were:

a. Various tensile properties
b. Bearing properties
c. Compressive properties

DESCRIPTION OF SPECIMENS:

Sixty glass reinforced plastic panels, numbered 101 through 160 of the following glass fabric and resin combinations were fabricated by the Plastics Shop, Dept. 35, and the Chemistry Laboratory of the Engineering Test Laboratories, at Convair, Ft. Worth:

| Panel Number | Glass Fabric | Resin as specified in FMS-0031(A) | Panel Size |
|---|---|---|---|
| 101 to 105 | 181 cloth | Class II (4232) | 26" x 24" |
| 106 to 110 | 181 cloth | Class III (506) | 26" x 24" |
| 111 to 115 | 181 cloth | Class IV (828) | 26" x 24" |
| 116 to 120 | 143 cloth | Class II (4232) | 24" x 22" |
| 121 to 125 | 143 cloth | Class III (506) | 24" x 22" |
| 126 to 130 | 143 cloth | Class IV (828) | 24" x 22" |
| 131 to 135 | 120 cloth | Class II (4232) | 14" x 12" |
| 136 to 140 | 120 cloth | Class III (506) | 14" x 12" |
| 141 to 145 | 120 cloth | Class IV (828) | 14" x 12" |
| 146 to 150 | 183 cloth | Class II (4232) | 14" x 12" |
| 151 to 155 | 183 cloth | Class III (506) | 14" x 12" |
| 156 to 160 | 183 cloth | Class IV (828) | 14" x 12" |

Of these panels, six were fabricated by the Chemistry Laboratory, as indicated in Table I. The others were fabricated by the Plastics Shop.

Of the cloths used in making the laminates, 143 was unidirectional, and the three others were bidirectional. By definition, a unidirectional cloth is one which has greatest strength when tested in one direction in relation to the fibering. A bidirectional cloth is one which has approximately equal strength in two directions.

The laminates were made with the following:

1. Laminac 4232 modified polyester resin reinforced with 181, 143, 120, and 183 style Garan Finished glass cloths.
2. 181, 143, 120, and 183 style Volan "A" finished glass cloths, pre-impregnated with Conolon 506 phenolic resin.
3. Epon 828 epoxy resin reinforced with 181, 143, 120, and 183 style Volan "A" finished glass cloths.

The curing system for Laminac 4232 resin was ATC (benzoyl peroxide with tricresyl phosphate) and the curing system for Epon 828 resin was meta-phenylene diamine.

The materials used in fabrication of the panels were obtained from the following vendors:

| | |
|---|---|
| American Cyanamid Company<br>Plastics and Resins Division<br>30 Rockefeller Plaza<br>New York, N. Y. | Class II (4232) resin |
| Cadet Chemical Corporation<br>Lockport - Olcott Road<br>Burtl, N. Y. | ATC (benzoyl peroxide with tricresyl phosphate) |
| E. I. duPont de Nemours & Co., Inc.<br>Wilmington 98, Delaware | ATC (benzoyl peroxide with tricresyl phosphate) and meta-phenylene diamine |
| Hess, Goldsmith & Co., Inc.<br>1400 Broadway, New York, N. Y. | 120 cloth<br>183 cloth |
| Narmco Resins & Coatings Co.<br>600 Victoria Street<br>Costa Mesa, California | 120 cloth pre-impregnated with Conolon 506<br>143 cloth ditto above<br>181 cloth ditto above<br>183 cloth ditto above |
| Shell Chemical Corporation<br>380 Madison Ave., New York, N. Y. | Epon 828 resin |
| J. P. Stevens & Co., Inc.<br>1460 Broadway<br>New York, N. Y. | 181 cloth |
| Trevarno Glass Fabrics<br>4924 Greenville Avenue<br>Dallas, Texas | 181 cloth |
| United Merchants & Mfg. Inc.<br>1407 Broadway<br>New York, N. Y. | 181, 143, and 120 cloth |

History sheets, supplied by the Inspection Department of the Plastics Shop accompanied each panel indicating the number of plies, cure cycle, and post-cure cycle. Barcol hardness, maximum and minimum thicknesses, resin content, the dielectric constant, and dissipation factor were determined for each panel. These items together with the date each panel was received from the shop are shown in Table I. It was originally planned that control tests were to be conducted on each panel. Specimens from each panel were to be tested to insure conformance with the minimum requirements of specification FMS-0031(A). However, after approximately 40 panels were received from the shop which did not meet these requirements, it was decided by the Engineering Materials and Processes Group to use only the following criteria as a basis of accepting panels for testing: Barcol test, dimensional tolerances, and over-all good appearance.

Various tensile properties, including Poisson's ratio, and bearing properties were determined for each condition shown in Table II. Four specimens, one from each of four different panels, were tested in the conditions indicated. To retain identity, each specimen was marked with the panel number from which it was taken and the letter A, B, or C, depending on the directionality with relation to the warp. (A signified that it was parallel to the warp direction, B that it was 45° to the warp direction, and C that it was 90° to the warp direction).

PROCEDURE:

The specimens were tested using the procedures given below. All tests at elevated temperatures were conducted by heating in ovens which were designed and constructed at Convair, Fort Worth.

Tensile Tests:

All tensile specimens were machined as shown in -1 and -3 of Figure 1, with the exception of those specimens taken from panels of 143 cloth and cut parallel to the direction of warp. Because 143 cloth is unidirectional, tensile specimens whose long dimension was parallel to the warp direction were machined with larger radii as shown in -1 and -3 of Figure 2. One end of the above tensile specimens was fabricated as shown in -5 of Figure 1 (regular type specimen) and in -5 of Figure 2 (unidirectional type specimen) for tests conducted at 500 F. So that less load to failure would be required, these specimens were machined .250" wide. Both of the above changes were made for 500 F tests to prevent bearing failures at the clevis.

Tests were conducted on 5000 and 60,000 lb. capacity Baldwin universal test machines equipped with MA-1 microformer recorders. The specimens were loaded at a constant rate so that failure occurred in approximately 2 to 3 minutes. Load versus strain curves were recorded autographically using various Baldwin microformer type extensometers with a 2-inch gage length.

Specimens tested at room temperature and 300 F were gripped with Templin grips. Strain measurements for tests conducted at 300 F were obtained by placing the extensometer inside the oven. Tests at 500 F were conducted using a Baldwin type PSH-8MS extensometer. To allow passage of the extension arms of this extensometer through the oven walls, a clevis fitting with a loading pin was used to load the bottom end of the specimen.

In order to determine the effect of exposure for 100 hours at 300 F under sustained tensile stress on the tensile properties at 300 F, specimens were loaded in Riehle creep-rupture machines. The loading was at 20 and 40% of the average tensile strength at room temperature. After so loading for 100 hours, each specimen was removed and tested in tension at 300 F.

Poisson's Ratio:

Determinations of Poisson's ratio at room temperature and 300 F were made on tensile-test specimens, and were obtained simultaneously with the tensile-test data. Longitudinal strain was determined with extensometers, and transverse strain was obtained using type ABF-11, SR-4 strain gages mounted at the center of the specimen in the transverse direction. Strain gage readings were taken under loading at 50 lb. intervals up to approximately 500 lbs. These data were then plotted to show the relationship of load versus transverse strain. The slope of the first straight portion of the load versus longitudinal strain curve and the slope of the load versus transverse strain curve were used to calculate Poisson's ratio as follows:

$$m(1) = \frac{L}{E(1)} \qquad m(t) = \frac{L}{E(t)}$$

$$P.R. = \frac{m(1)}{m(t)} = \frac{\frac{L}{E(1)}}{\frac{L}{E(t)}} = \frac{E(t)}{E(1)}$$

m (1) - slope of first straight portionof the load vs. longitudinal strain curve.
m (t) - slope of load vs. transverse strain curve.

E (l) - longitudinal strain (in/in).
E (t) - transverse strain (in/in)
L - load (lbs.)
P. R. - Poisson's ratio

Bearing Tests:

All the specimens used for bearing tests were machined according to the drawing shown for -7 of Figure 1. The tests were conducted on 5000 and 60,000 lb. capacity Baldwin universal test machines using the fixture shown in Figure 3. Bearing-load versus hole-deformation curves were recorded autographically. The same procedure as stated above for the tensile tests was used to determine the effect of 100 hours exposure at 300 F. under sustained bearing stress on the bearing properties at 300 F. An exception to this procedure was used for specimens taken from panels fabricated from 181 cloth with Class IV (828) resin. Because two of these specimens failed during the 100 hours soak at 300 F. while loaded to 20% of the average room temperature bearing strength, the soak temperature was changed to 260 F. for this material.

Ultimate bearing strength, bearing yield strength, and the type of failure were determined for each bearing specimen tested. Bearing yield strength is that stress at which the bearing hole was deformed 4% of its original diameter. This was obtained from the load-deformation curves by extending a vertical line crossing the abscissa at .0075" until it intersected the curve. For some specimens, particularly 143 cloth with Class III (506) resin, failure occurred before this point was reached so the hole deformation at failure was recorded. All specimens were loaded at a constant rate so that failure occurred in approximately 2 to 3 minutes.

Compression Tests:

Since some of the compression tests have not been completed, particularly the sustained load tests, the pertinent data will be reported in an addendum to this report at a later date.

RESULTS:

The properties determined in the tensile tests for the laminates in the various conditions are given in Tables III through X. Also, the values for the tensile strengths and moduli of elasticity are shown graphically in Figures 4 through 10. Typical stress-strain curves are shown in Figures 11 through 27. Figures 28-1 and 28-2 are photographs of representative tensile failures.

The results of the bearing tests are given in Tables XI through XVIII, and the values are shown graphically in Figures 29 through 34. Typical stress-deformation curves are shown in Figures 35 through 49. Figures 50 and 51 are photographs of typical bearing failures.

Compression results are not complete and will be reported in an addendum to this report as soon as possible.

DISCUSSION:

Poisson's Ratio - The average values for Poisson's ratio determined at room temperature varied considerably with the direction of warp for each material investigated. Average values ranged from .086 for 181 cloth with Class II (4232) resin to .278 for 143 cloth with Class III (506) resin when measured parallel to the warp direction. They ranged from .16 for 143 cloth with Class II (4232) resin to .513 for 181 cloth with Class IV (828) resin when measured at 45° to the warp direction. The variation was from .051 for 143 cloth with Class II (4232) resin to .165 for 181 cloth with Class IV (828) resin at 90° to the warp direction. Average values of .068 for 181 cloth with Class II (4232) resin and .265 for 143 cloth with Class III (506) resin represented the minimum and maximum average values obtained at 300 F, as measured parallel to the warp direction.

The manufacturer of the strain gages used in the determinations of Poisson's ratio indicated through correspondence that these gages had an accuracy of plus 3 to 4% when used in the transverse direction.

Tension Properties - Primary modulus, secondary modulus, primary proportional limit, secondary proportional limit, type of failure, and ultimate strength for each tensile specimen are recorded in Tables III through X. These results are shown in bar graph form in Figures 4 through 10. Typical stress-strain curves are shown for each condition in Figures 11 through 27. Figures 28-1 and 28-2 are photographs showing typical tensile failures designated D, T, S and U. Specimens which failed by separation of bonds between layers of cloth were designated D (delamination type failures). In these cases the bonds were broken. Whether delamination occurred before actual tension failure is not known. A break in which the specimen failed primarily in the fibers of the cloth was designated U (unidirectional). Two other types of failures which could not be attributed primarily to a break in the bond between cloths or to a fibrous failure of the cloth were designated T (tension) and S (shear).

Average values are included in the Tables and plotted on the bar graphs for secondary modulus as well as primary modulus. Some tensile specimens, however, exhibited no secondary modulus. Because the stress-strain curves for specimens whose long dimension was 45° to the warp direction did not contain a clearly defined straight portion, determinations for the correct modulus were difficult and led to much scatter in the data for this condition.

The primary proportional limit was taken as the upper limit of the first straight portion (primary modulus) of the stress-strain curve, and the secondary proportional limit was taken as the upper limit of the second straight portion (secondary modulus) of the stress-strain curve. Some specimens, particularly those parallel to the warp direction, gave stress-strain curves consisting of one straight line (primary modulus). For such specimens the ultimate strength was recorded as the primary proportional limit. Other specimens had stress-strain curves which did not depart from the secondary modulus line at higher stress levels. In these cases, the ultimate strength was recorded as the secondary proportional limit.

Values recorded for primary proportional limit and secondary proportional limit tend to be deceiving. If a particular specimen has no secondary modulus (e.g., 101-C-5 of Table III), its primary proportional limit may be a value which is many times larger than that of another specimen tested (e.g., 103-C-4 of Table III), which has a secondary modulus. It is for this reason that average values for primary proportional limit and secondary proportional limit are not included in the Tables.

For laminates made with 181 cloth (see Figures 4, 5 and 6), the average values for tensile ultimate strength and modulus as measured parallel to the warp direction were approximately equal to those properties when measured 90° to the warp direction. The average values for these properties as measured 45° to the warp direction were approximately half of the parallel and 90° values or less. Average tensile ultimate strength and modulus values of specimens made with 181 cloth with Class II (4232) resin and 181 cloth with Class III (506) resin and tested at 500 F show that these materials retained approximately 75% or more of their room temperature properties at 500 F. The properties of 181 cloth with Class IV (828) resin dropped 30% or more at 300 F and substantially more at 500 F. No significant effect on the tensile properties of these materials at 300 F was observed due to loading specimens to 20 and 40% of their room temperature tensile strength while soaking them at 300 F for 100 hours. Two-inch gage marks were made on several of these specimens and no elongation was observed after the specimens were unloaded.

For laminates made with 143 cloth (see Figures 7, 8, and 9), the average values of ultimate tensile strength at 45° and 90° to the warp direction were approximately equal. These values at room temperature for 143 cloth with Class II (4232) resin, 143 cloth with Class III (506) resin, and 143 cloth with Class IV (828) resin were approximately 21, 15, and 20%, respectively, of the average strengths obtained for specimens whose long dimension was parallel to the warp direction.

A comparison at room temperature and 500 F of the tensile properties parallel to the warp direction of 120 and 183 cloths with Class II (4232), Class III (506), and Class IV (828) resins is shown in Figure 10. No secondary modulus was observed on specimens of 183 cloth with Class II (4232) resin at 500 F.

Of the four types of tensile failures that occurred, as shown in Figures 28-1 and 28-2, only types T(tension) and D(delamination) were observed on specimens of 181 cloth with Class II (4232) and Class III (506) resins. For these materials, a delamination type of failure was observed on all specimens tested at 45° to the direction of warp. Tensile failures of all specimens taken from panel 105 regardless of warp direction were delamination-type failures, as indicated in Table III.

Some specimens made with 143 cloth exhibited a U (unidirectional) type of failure, as shown in Figure 28-2. This type of failure occurred only on specimens whose long dimension was parallel to the warp direction. A fourth type of failure, designated S (shear), was observed on some specimens whose long dimension was 45° to the warp direction. This type is also shown in Figure 28-2.

All specimens taken from panels made with 181 type cloth and cut parallel to the direction of warp exceeded the requirements of specification FMS-0031(A) with the following exceptions, (see Tables III, IV and V):

| Cloth & Resin Combination | Specimen No. | Treatment or Condition |
|---|---|---|
| 181 cloth - Class III (506) resin | 108-A-1 | R. T. |
| | 107-A-3 | Wet |
| | 110-A-7 | Wet |
| | 107-A-8 | 1/2 hr. at 300 F |
| | 110-A-3 | 1/2 hr. at 500 F |
| 181 cloth - Class IV (828) resin | 111-A-1 | R. T. |
| | 113-A-1 | R. T. |
| | 114-A-1 | R. T. |
| | 112-A-3 | 1/2 hr. at 300 F |
| | 114-A-3 | 1/2 hr. at 300 F |

Bearing Tests - Bearing yield strength, ultimate bearing strength and type of failure are recorded for each bearing specimen in Tables XI through XVIII. These results are shown in bar chart form in Figures 29 through 34. Stress-deformation curves for each condition are shown in Figures 35 through 49. The bearing data obtained from specimens of 143 cloth with Class IV (828) resin were not plotted in bar graph form because of erratic results. Figure 50 is a photograph showing the four typical failures in bearing tests. These four types were designated as bearing, shear, tension, and tension-shear.

Average values for ultimate bearing strength and bearing yield strength of specimens made with 181 cloth did not vary more than 10 to 15% with the direction of testing, as indicated by the data in Tables XI, XII, and XIII. All these specimens with the exception of specimens 107-C-1 and 107-A-5 (Table XII) exhibited bearing type failures.

Soaking at 20 and 40% of their average room temperature bearing ultimate strength for 100 hours had no significant effect on the bearing properties at 300 F for specimens of 181 cloth with Class II (4232) and Class III (506) resins. Average bearing strengths for specimens of 181 cloth with Class III (506) resin dropped approximately 8% of their room temperature strengths when tested at 500 F. This represented the least drop in room temperature bearing strength for all specimens tested at 500 F.

Although specimens of 181 cloth with Class IV (828) resin had the highest average room temperature bearing strength, the bearing properties at 300 F dropped to approximately one-half the room temperature average values, as is shown in Figure 31. Two specimens of this material were soaked at 300 F while loaded to 20% of their room temperature bearing strength. Failure occurred, however, before 100 hours of soak time was reached. The soak temperature for this material was thenchanged to 260 F. Three specimens were loaded to 20% and five to 40% of their room temperature bearing strength while soaking at 260 F for 100 hours. One of the specimens loaded to 20% and four of the specimens loaded to 40% failed before 100 hours of soak was reached, as recorded in Table XIII. Photographs of four of these failed specimens are shown in Figure 51.

For 181 cloth with Class IV (828) resin, testing at 500 F reduced the average bearing strength to approximatley 12% of the average strength at room temperature, as shown in Figure 31. This represented the greatest drop in strength with temperature for all fabric and resin combinations investigated. Some of these specimens tested at 500 F failed before the bearing hole was deformed

to .0075"; therefore, deformation at failure instead of yield strength is recorded in the Tables for these specimens.

A comparison of the bearing properties for each test condition is shown in Figure 32 for 143 cloth with Class II (4232) resin and in Figure 33 for 143 cloth with Class III (506) resin. The properties decreased slightly with angle of warp for each condition.

A large number of bearing specimens which were made from 143 cloth and cut 90° to the direction of warp exhibited tension type failures, as is shown in Tables XIV, XV, and XVI. This was the result of poor tensile strength in this material in the 90° direction. Since a number of specimens made with 143 cloth failed before the bearing hole deformed .0075", deformation at failure was recorded in the Tables.

A comparison of the bearing properties, parallel to the warp direction, at room temperature and 500 F of 120 and 183 cloths with Class II (4232), Class III (506) and Class IV (828) resins is shown in Figure 34.

Compression Tests - As soon as compression tests are completed, the results will be published in an addendum to this report. Compression properties will be determined for the same conditions as shown in Table II. Two types of compression jigs and three means of measuring compressive strain will be evaluated.

CONCLUSIONS:

The results of this investigation consist of empirical data to be used in establishing design allowables at room and elevated temperatures for all combinations of the following glass fabrics and resins: Types 181, 143, 120, and 183 glass cloths with Class II (4232), Class III (506), and Class IV (828) type resins. From the data obtained, the following general conclusions are drawn:

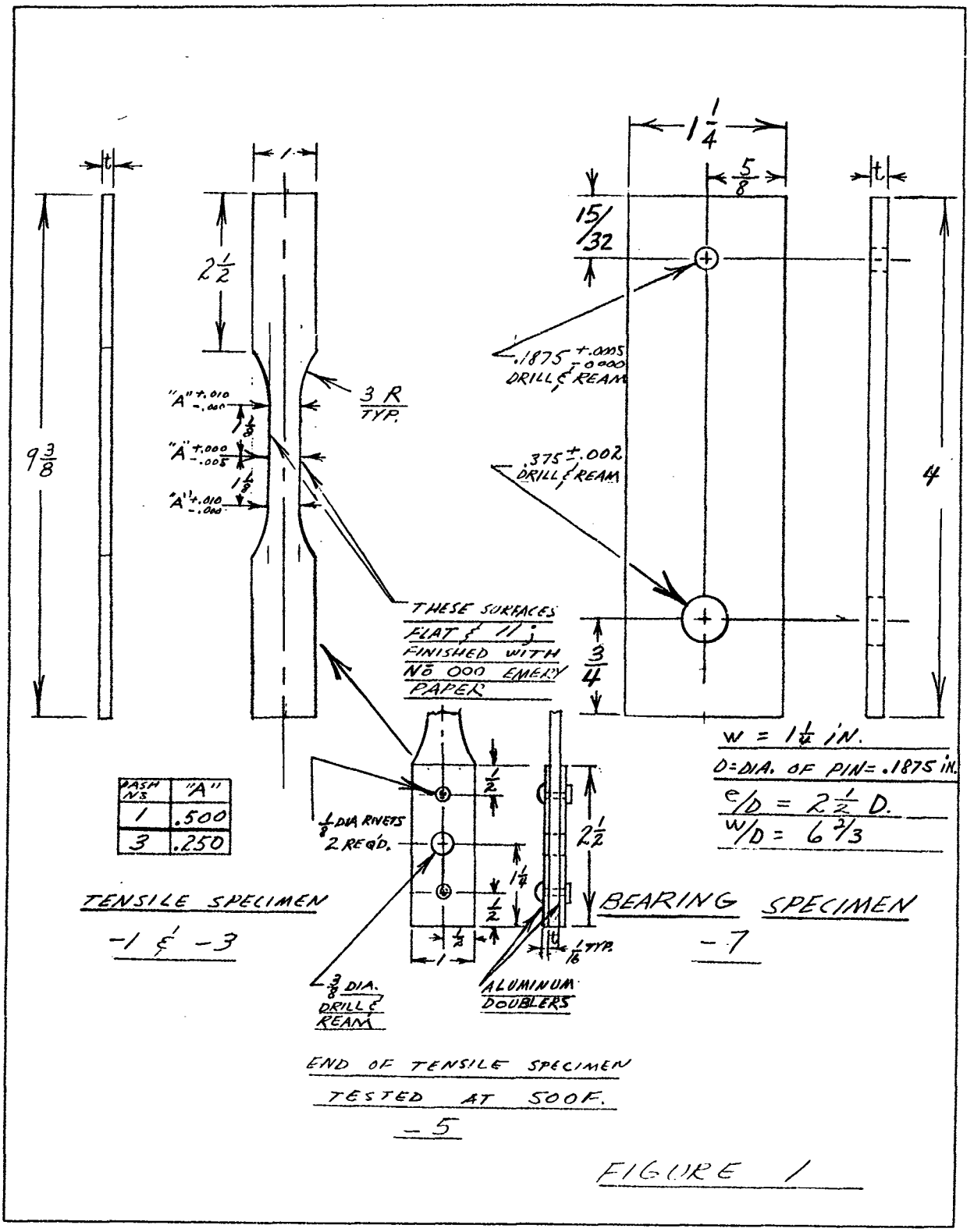
1. The values for Poisson's ratio decrease with temperature for laminates made with 181 and 143 cloths.

2. Laminates made with 181 cloth have tensile strengths which are approximately equal at 0 and 90° to the warp direction and approximately twice the strength of the material at 45° to the warp direction.

3. Exposures for 100 hours at 300 F at loads of 20 and 40% of room temperature ultimate tensile strength have no effect on the tensile properties at 300 F parallel to the warp direction for laminates made with 181 and 143 cloths.

4. Bearing properties of laminates made with 181 cloth are independent of warp direction.

5. Exposures for 100 hours at 300 F at loads of 20 and 40% of room temperature bearing strength have no effect on the bearing properties at 300 F for the following glass cloth and resin combinations: 181 cloth with Class II (4232) resin, 181 cloth with Class III (506) resin, and 143 cloth with Class II (4232) resin. Similar bearing loads at 300 F on laminates consisting of 181 cloth with Class IV (828) resin may cause failure before 100 hours of soak time is reached.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3 R TYP.
THESE SURFACES FLAT & U.J. FINISHED WITH NO 000 EMERY PAPER
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.375 +.002 DRILL & REAM
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W = 1 1/2 IN.
D = DIA. OF PIN = .1875 IN.
e/D = 2 1/2 D.
W/D = 6 2/3
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1 | .500
3 | .250
1/2
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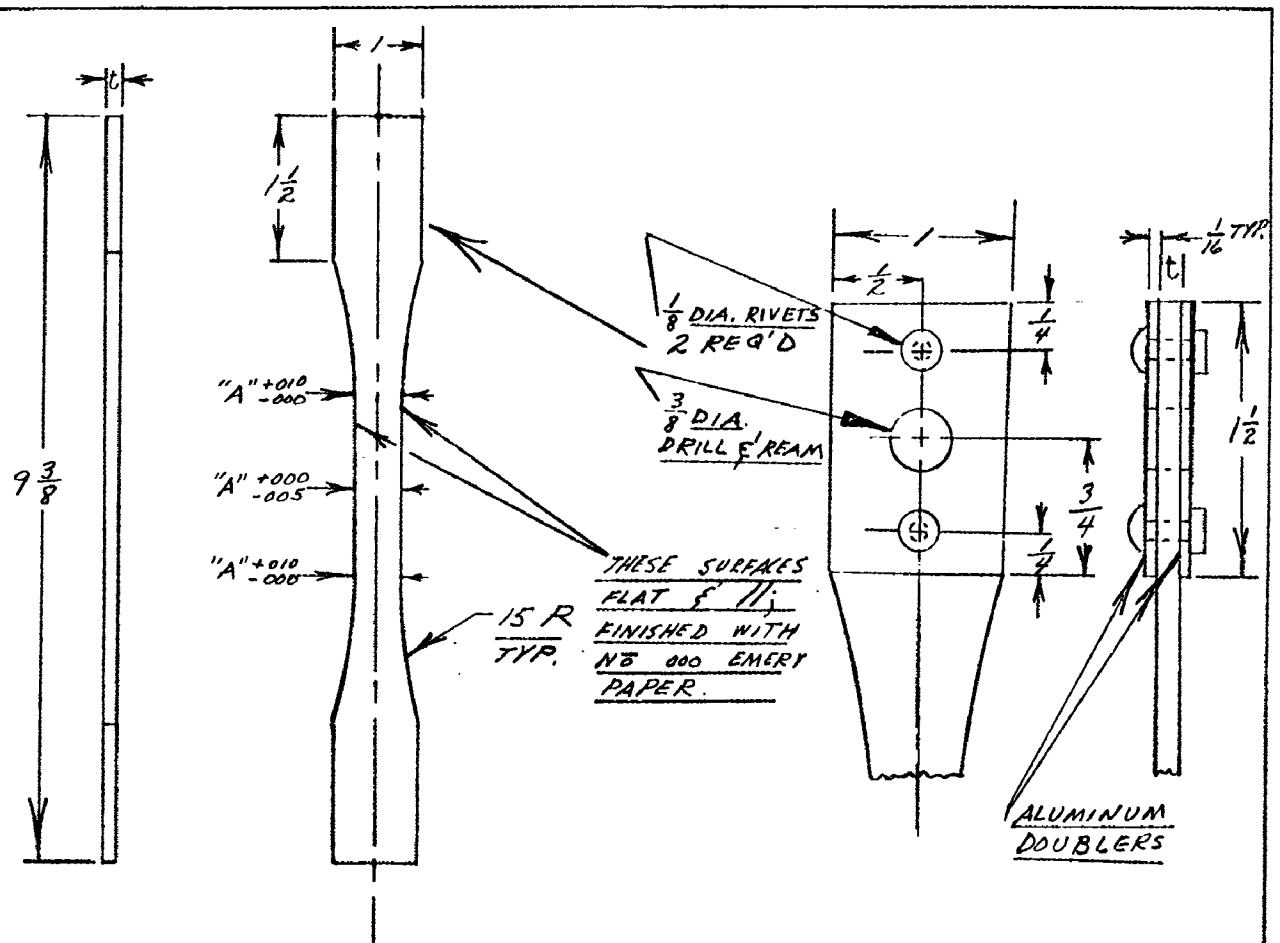
ALUMINUM DOUBLERS
TENSILE SPECIMEN -1 & -3
BEARING SPECIMEN -7
END OF TENSILE SPECIMEN TESTED AT 500°F. -5

FIGURE 1




| DASH NO. | "A" |
|---|---|
| 1 | .500 |
| 3 | .250 |

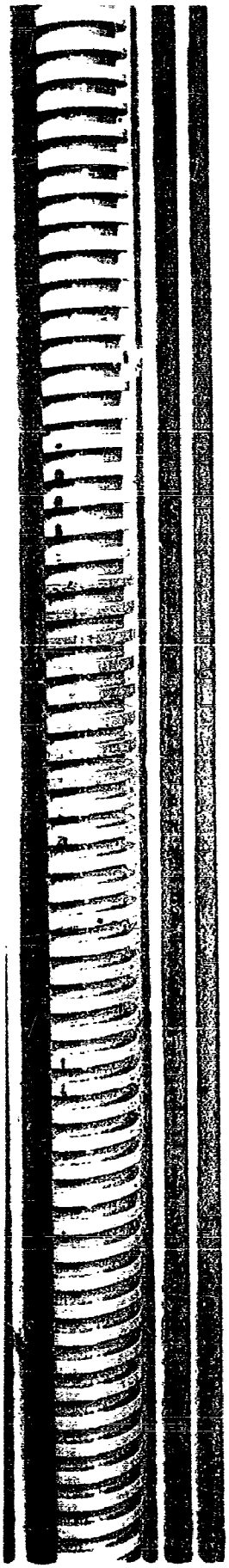
UNIDIRECTIONAL TENSILE SPECIMEN

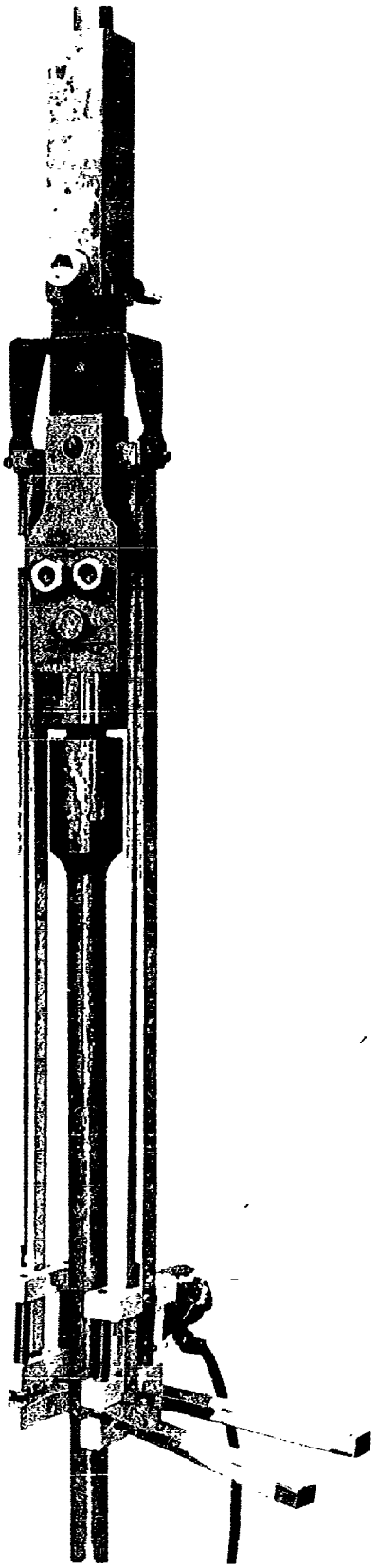
-1 & -3

END OF UNIDIRECTIONAL SPECIMEN TESTED AT 500 F

-5

FIGURE 2





2-[illegible]640 1-13-59
BEARING TEST SETUP FOR
REINFORCED GLASS CLOTH
LAMINATES -
[illegible]-8 F-6072
CONVAIR FT. WORTH TEXAS

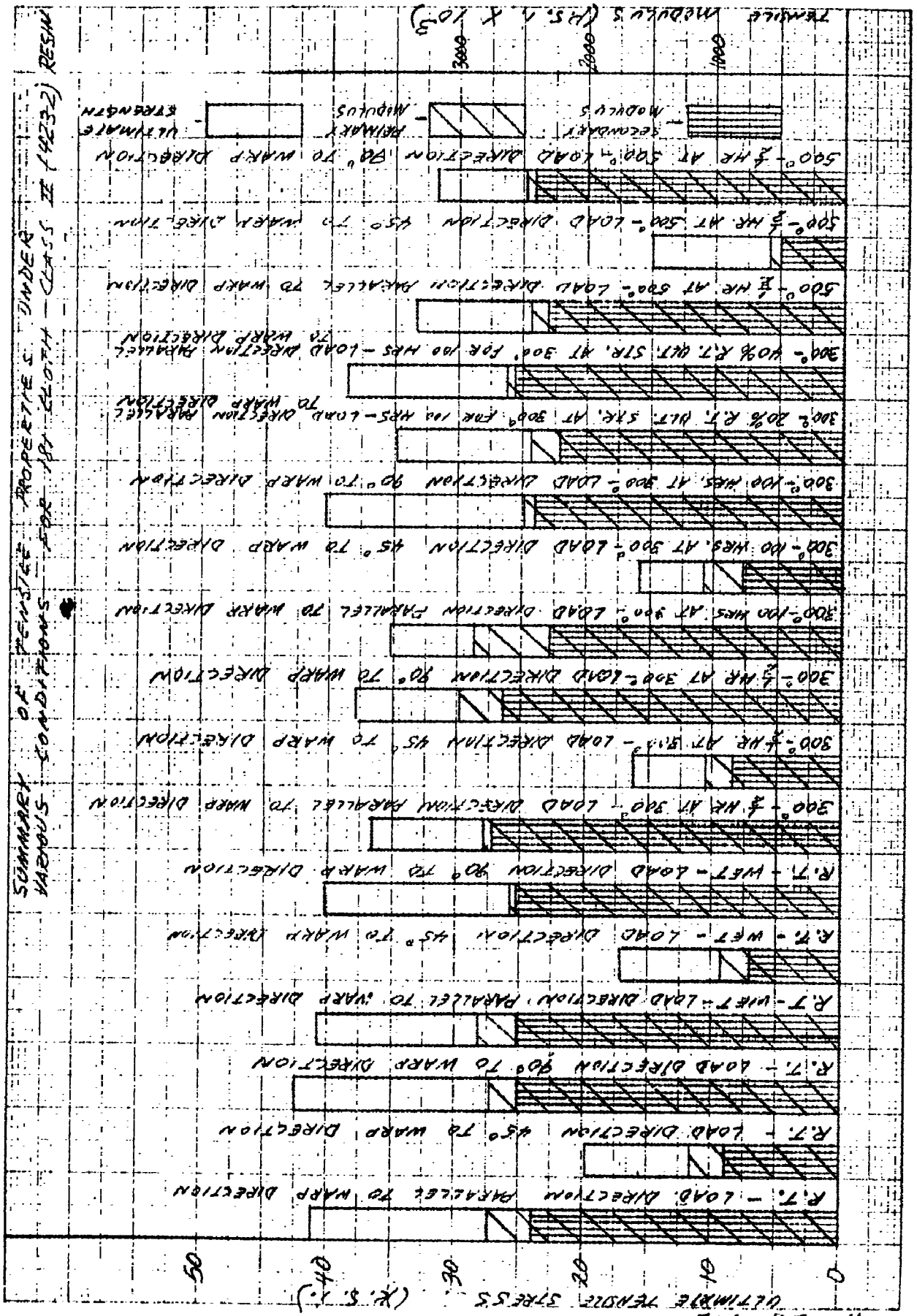

SUMMARY OF TENSILE PROPERTIES UNDER VARIOUS CONDITIONS FOR 181 CLOTH - CLASS II (4232) RESIN
TENSILE MODULUS (P.S.I. X 10^3)
3000
2000
1000
ULTIMATE STRENGTH
PRIMARY MODULUS
SECONDARY MODULUS
500° - 1/2 HR AT 500° - LOAD DIRECTION 90° TO WARP DIRECTION
500° - 1/2 HR AT 500° - LOAD DIRECTION 45° TO WARP DIRECTION
500° - 1/2 HR AT 500° - LOAD DIRECTION PARALLEL TO WARP DIRECTION
300° - 40% R.T. ULT. STR. AT 300° FOR 100 HRS - LOAD DIRECTION PARALLEL TO WARP DIRECTION
300° - 20% R.T. ULT. STR. AT 300° FOR 100 HRS - LOAD DIRECTION PARALLEL TO WARP DIRECTION
300° - 100 HRS. AT 300° - LOAD DIRECTION 90° TO WARP DIRECTION
300° - 100 HRS. AT 300° - LOAD DIRECTION 45° TO WARP DIRECTION
300° - 100 HRS. AT 300° - LOAD DIRECTION PARALLEL TO WARP DIRECTION
300° - 1/2 HR AT 300° - LOAD DIRECTION 90° TO WARP DIRECTION
300° - 1/2 HR AT 300° - LOAD DIRECTION 45° TO WARP DIRECTION
300° - 1/2 HR AT 300° - LOAD DIRECTION PARALLEL TO WARP DIRECTION
R.T. - WET - LOAD DIRECTION 90° TO WARP DIRECTION
R.T. - WET - LOAD DIRECTION 45° TO WARP DIRECTION
R.T. - WET - LOAD DIRECTION PARALLEL TO WARP DIRECTION
R.T. - LOAD DIRECTION 90° TO WARP DIRECTION
R.T. - LOAD DIRECTION 45° TO WARP DIRECTION
R.T. - LOAD DIRECTION PARALLEL TO WARP DIRECTION
ULTIMATE TENSILE STRESS (K.S.I.)
50
40
30
20
10
0

FIGURE 4

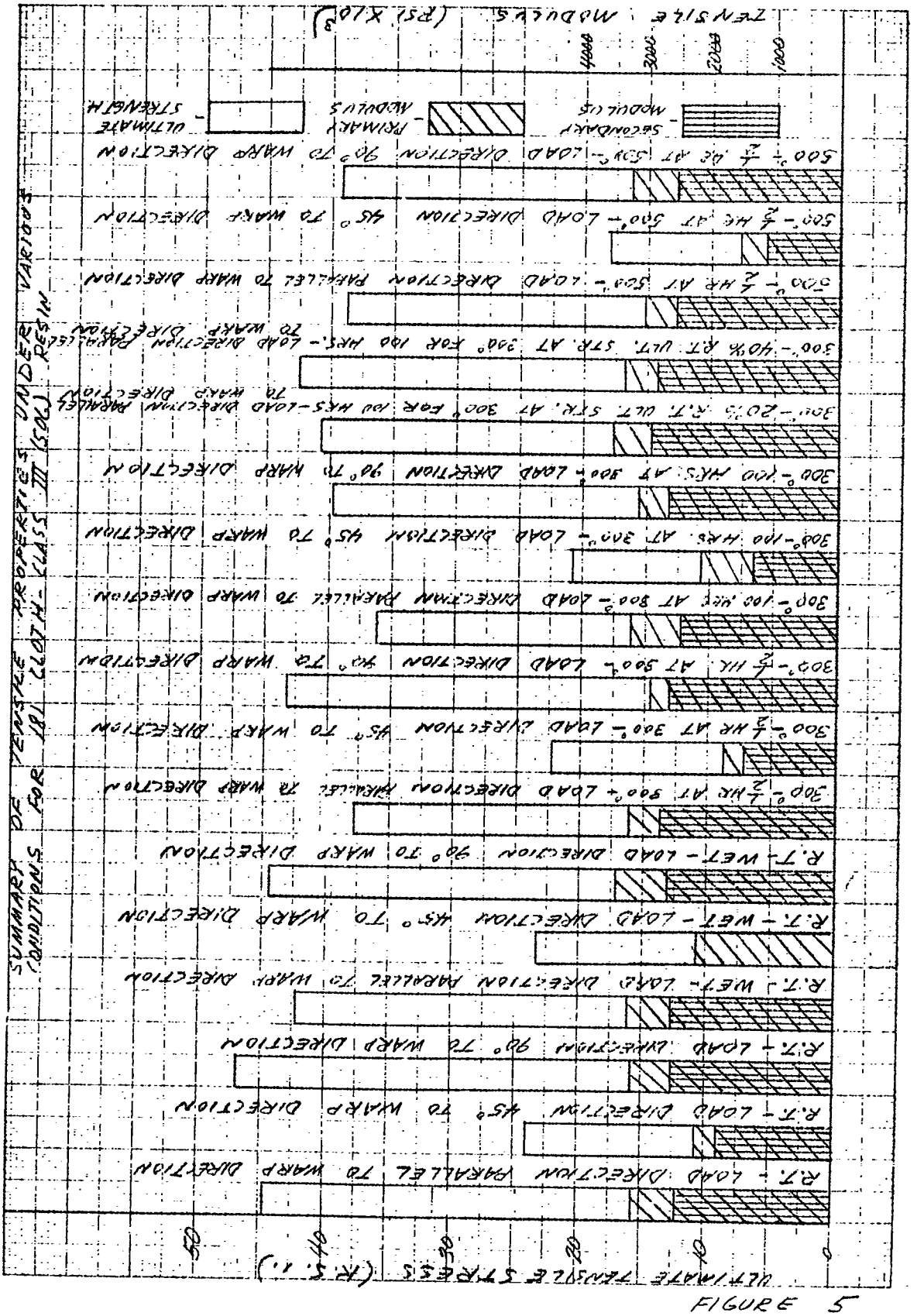

SUMMARY OF TENSILE PROPERTIES UNDER VARIOUS CONDITIONS FOR 181 CLOTH - CLASS III (SOL) RESIN
TENSILE MODULUS (PSI X 10^3)
ULTIMATE TENSILE STRESS (K.S.I.)
ULTIMATE STRENGTH
PRIMARY MODULUS
SECONDARY MODULUS
R.T. - LOAD DIRECTION PARALLEL TO WARP DIRECTION
R.T. - LOAD DIRECTION 45° TO WARP DIRECTION
R.T. - LOAD DIRECTION 90° TO WARP DIRECTION
R.T. - WET - LOAD DIRECTION PARALLEL TO WARP DIRECTION
R.T. - WET - LOAD DIRECTION 45° TO WARP DIRECTION
R.T. - WET - LOAD DIRECTION 90° TO WARP DIRECTION
300° - 1/2 HR AT 300° - LOAD DIRECTION PARALLEL TO WARP DIRECTION
300° - 1/2 HR AT 300° - LOAD DIRECTION 45° TO WARP DIRECTION
300° - 1/2 HR AT 300° - LOAD DIRECTION 90° TO WARP DIRECTION
300° - 100 HRS. AT 300° - LOAD DIRECTION PARALLEL TO WARP DIRECTION
300° - 100 HRS. AT 300° - LOAD DIRECTION 45° TO WARP DIRECTION
300° - 100 HRS. AT 300° - LOAD DIRECTION 90° TO WARP DIRECTION
300° - 20% R.T. ULT. STR. AT 300° FOR 100 HRS - LOAD DIRECTION PARALLEL TO WARP DIRECTION
300° - 40% R.T. ULT. STR. AT 300° FOR 100 HRS. - LOAD DIRECTION PARALLEL TO WARP DIRECTION
500° - 1/2 HR AT 500° - LOAD DIRECTION PARALLEL TO WARP DIRECTION
500° - 1/2 HR AT 500° - LOAD DIRECTION 45° TO WARP DIRECTION
500° - 1/2 HR AT 500° - LOAD DIRECTION 90° TO WARP DIRECTION
1000
2000
3000
4000
0
10
20
30
40
50

FIGURE 5

SUMMARY OF TENSILE PROPERTIES UNDER VARIOUS CONDITIONS FOR 181 CLOTH - CLASS II (P2P) RESIN
ULTIMATE TENSILE STRESS (KSI)
0
10
20
30
40
50
R.T. - LOAD DIRECTION PARALLEL TO WARP DIRECTION
R.T. - LOAD DIRECTION 45° TO WARP DIRECTION
R.T. - LOAD DIRECTION 90° TO WARP DIRECTION
R.T.+ WET- LOAD DIRECTION PARALLEL TO WARP DIRECTION
R.T.+ WET- LOAD DIRECTION 45° TO WARP DIRECTION
R.T.-WET- LOAD DIRECTION 90° TO WARP DIRECTION
300°+½ HR AT 300°- LOAD DIRECTION PARALLEL TO WARP DIRECTION
300°-½ HR AT 300°- LOAD DIRECTION 45° TO WARP DIRECTION
300°+½ HR AT 300°- LOAD DIRECTION 90° TO WARP DIRECTION
300°+100 HRS AT 300°- LOAD DIRECTION PARALLEL TO WARP DIRECTION
300°-100 HRS AT 300°- LOAD DIRECTION 45° TO WARP DIRECTION
500°+100 HRS AT 300°- LOAD DIRECTION 90° TO WARP DIRECTION
300°+20% R.T. ULT. STR. AT 300° FOR 100 HRS. - LOAD DIRECTION PARALLEL TO WARP DIRECTION
300°+40% R.T. ULT. STR. AT 500° FOR 100 HRS. - LOAD DIRECTION PARALLEL TO WARP DIRECTION
500°-½ HR AT 500°- LOAD DIRECTION PARALLEL TO WARP DIRECTION
500°-½ HR AT 500°- LOAD DIRECTION 45° TO WARP DIRECTION
500°-½ HR AT 500°- LOAD DIRECTION 90° TO WARP DIRECTION
SECONDARY - MODULUS
PRIMARY - MODULUS
ULTIMATE - STRENGTH
TENSILE MODULUS (PSI x 10⁶)
1000
2000
3000
4000

FIGURE 6

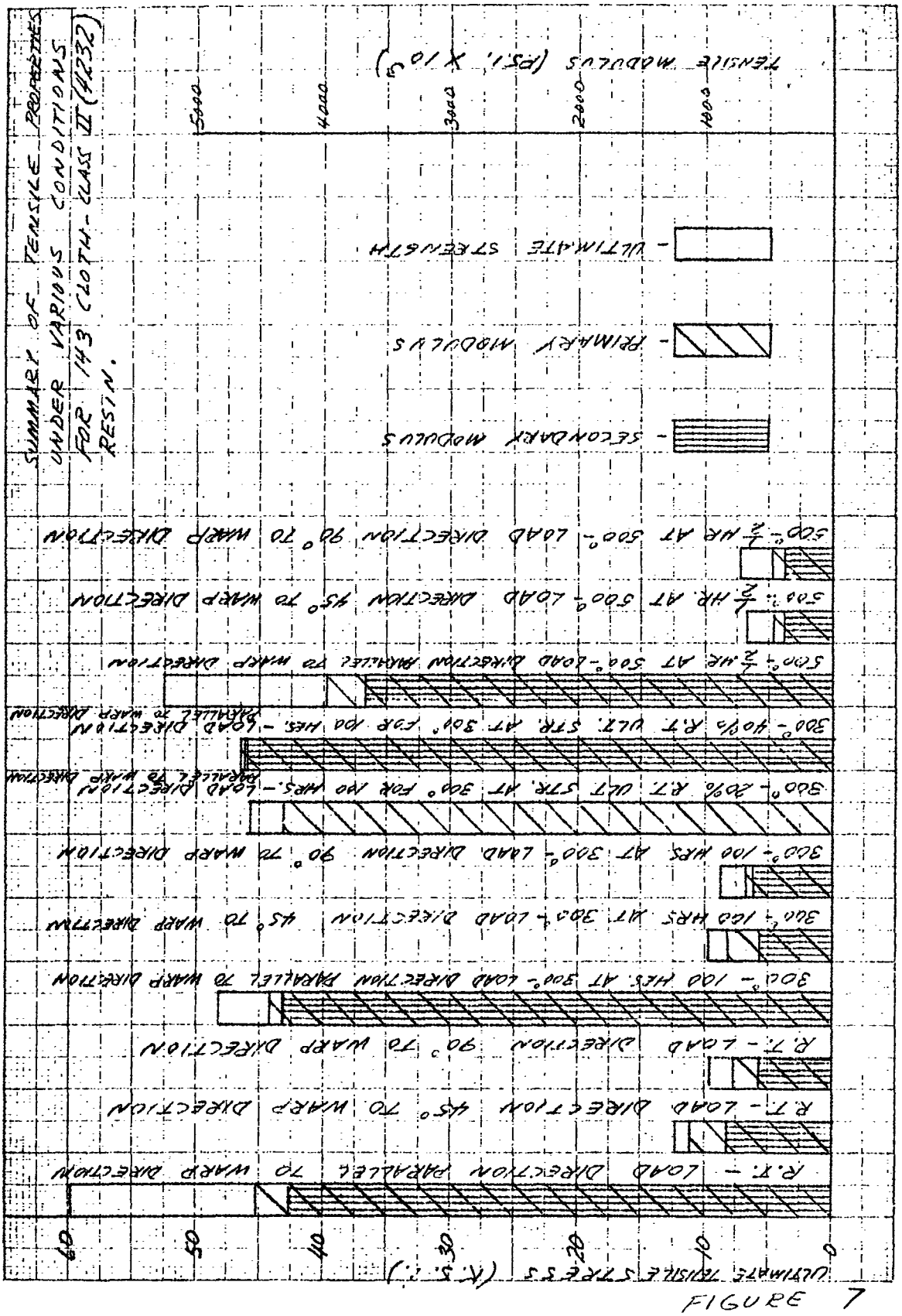

SUMMARY OF TENSILE PROPERTIES UNDER VARIOUS CONDITIONS FOR 143 CLOTH-CLASS II (4232) RESIN.
TENSILE MODULUS (PSI. X 10⁵)
ULTIMATE STRENGTH
PRIMARY MODULUS
SECONDARY MODULUS
500° - ½ HR AT 500° - LOAD DIRECTION 90° TO WARP DIRECTION
500° - ½ HR AT 500° - LOAD DIRECTION 45° TO WARP DIRECTION
500° - ½ HR AT 500° - LOAD DIRECTION PARALLEL TO WARP DIRECTION
300° - 40% R.T. ULT. STR. AT 30° FOR 40 HRS. - LOAD DIRECTION PARALLEL TO WARP DIRECTION
300° - 20% R.T. ULT. STR. AT 30° FOR 40 HRS. - LOAD DIRECTION PARALLEL TO WARP DIRECTION
300° - 100 HRS AT 300° - LOAD DIRECTION 90° TO WARP DIRECTION
300° - 100 HRS AT 300° - LOAD DIRECTION 45° TO WARP DIRECTION
300° - 100 HRS. AT 300° - LOAD DIRECTION PARALLEL TO WARP DIRECTION
R.T. - LOAD DIRECTION 90° TO WARP DIRECTION
R.T. - LOAD DIRECTION 45° TO WARP DIRECTION
R.T. - LOAD DIRECTION PARALLEL TO WARP DIRECTION
ULTIMATE TENSILE STRESS (K.S.I.)
0
10
20
30
40
50
60
1000
2000
3000
4000
5000

FIGURE 7

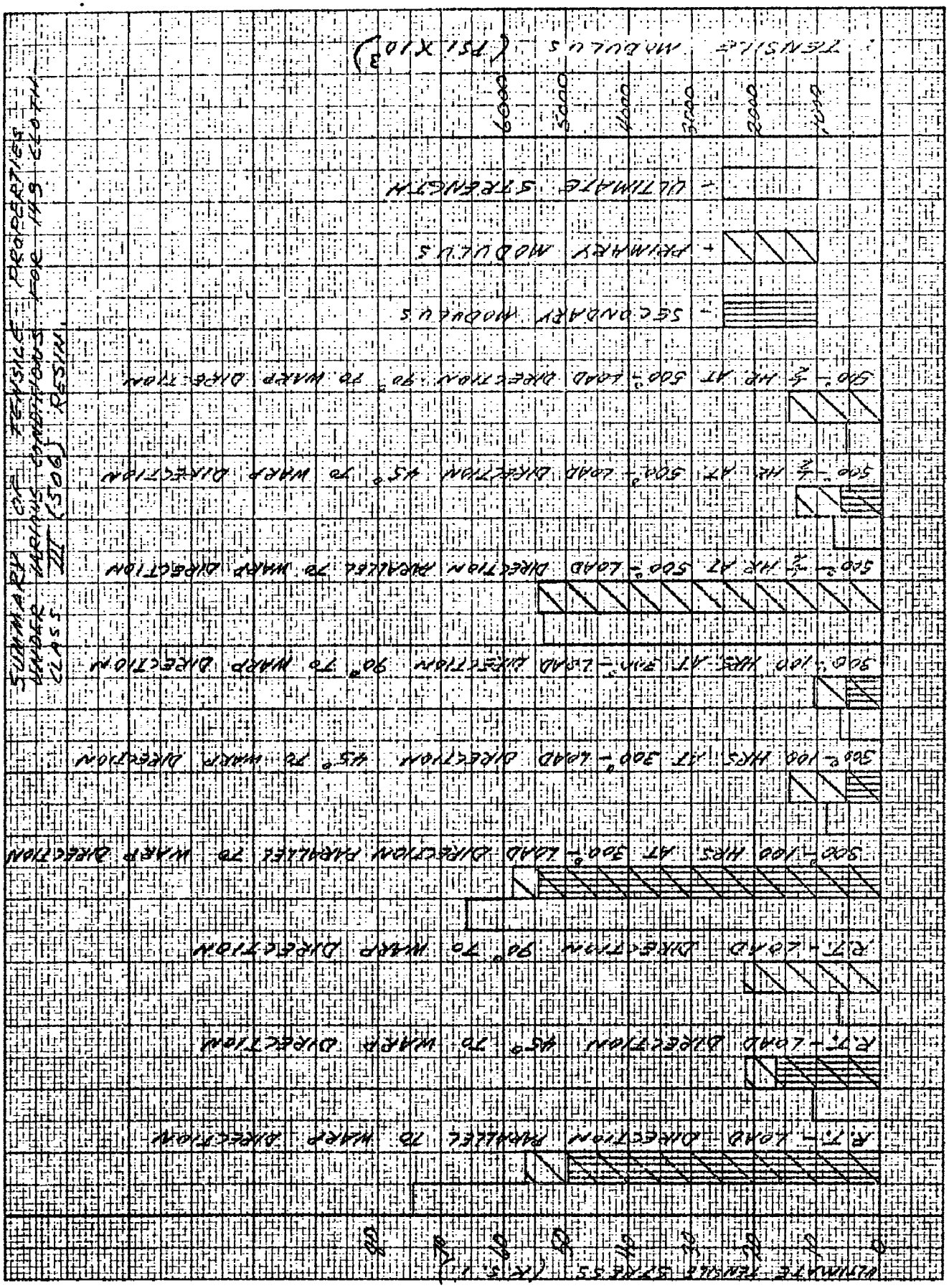

SUMMARY OF TENSILE PROPERTIES UNDER VARIOUS CONDITIONS FOR 143 CLOTH CLASS III (506) RESIN
TENSILE MODULUS (PSI X 10^3)
6000
5000
4000
3000
2000
1000
ULTIMATE STRENGTH
PRIMARY MODULUS
SECONDARY MODULUS
500°-½ HR AT 500°-LOAD DIRECTION 90° TO WARP DIRECTION
500°-½ HR AT 500°-LOAD DIRECTION 45° TO WARP DIRECTION
500°-½ HR AT 500°-LOAD DIRECTION PARALLEL TO WARP DIRECTION
500°-100 HRS AT 300°-LOAD DIRECTION 90° TO WARP DIRECTION
500°-100 HRS AT 300°-LOAD DIRECTION 45° TO WARP DIRECTION
500°-100 HRS AT 300°-LOAD DIRECTION PARALLEL TO WARP DIRECTION
R.T.-LOAD DIRECTION 90° TO WARP DIRECTION
R.T.-LOAD DIRECTION 45° TO WARP DIRECTION
R.T.-LOAD DIRECTION PARALLEL TO WARP DIRECTION
ULTIMATE TENSILE STRESS (K.S.I.)
80
70
60
50
40
30
20
10
0

FIGURE 8

SUMMARY OF TENSILE PROPERTIES FOR WOVEN VARIOUS CONDITIONS FOR 181 CLOTH - CLASS III (dap) RESIN




FW 156—3-54
Dept. 6

FIGURE 9

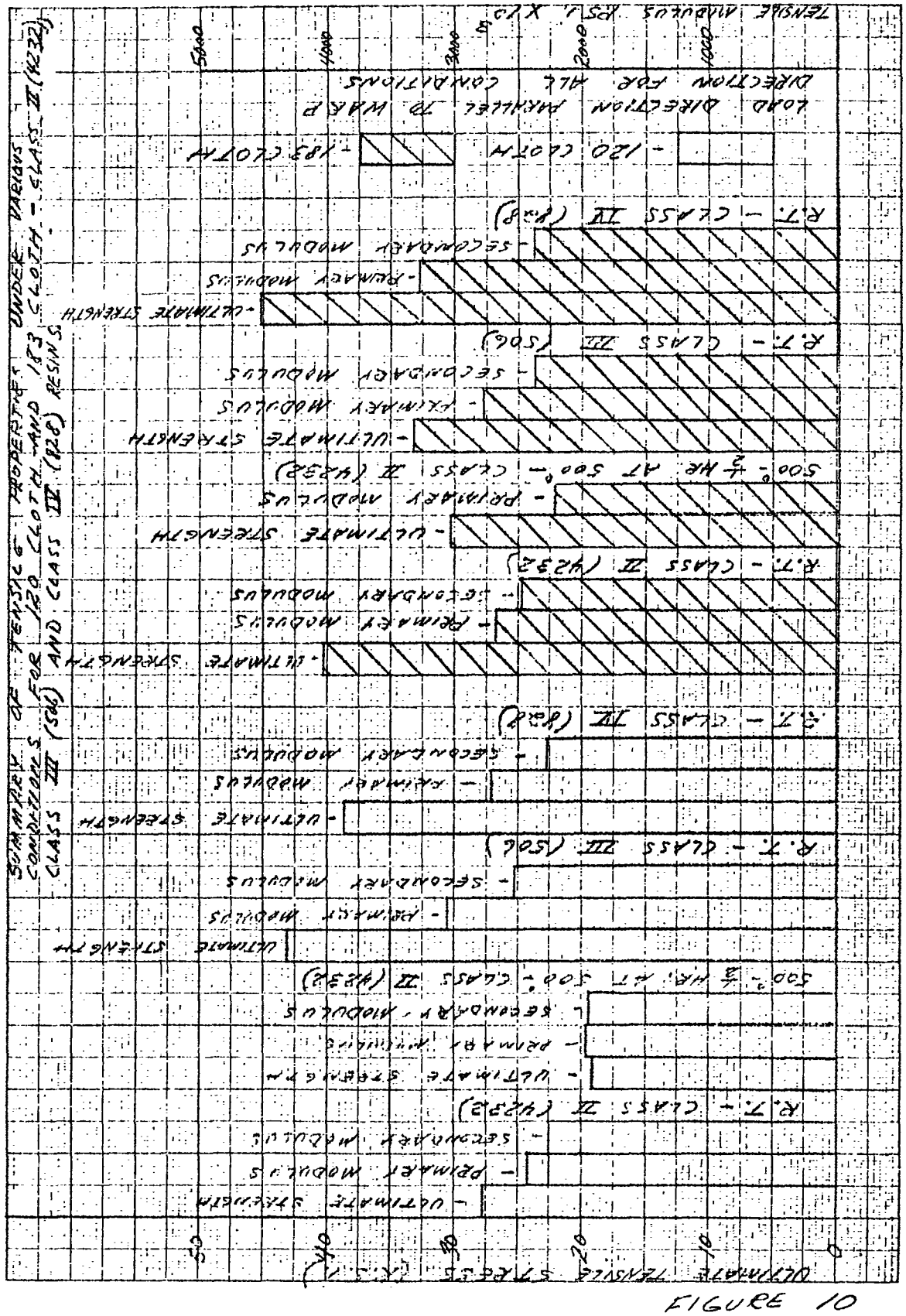
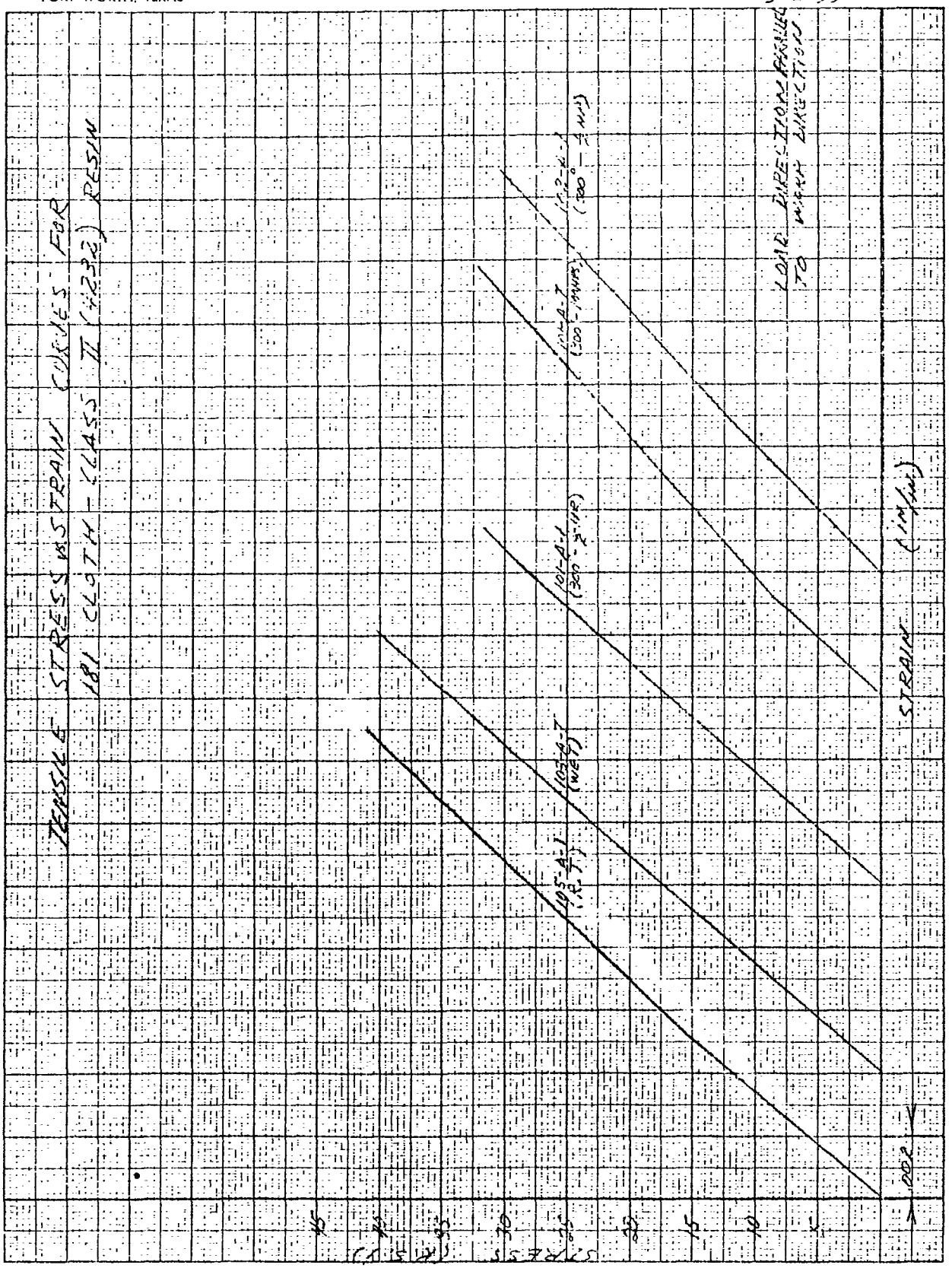

SUMMARY OF TENSILE PROPERTIES UNDER VARIOUS CONDITIONS FOR 120 CLOTH AND 183 CLOTH - CLASS II (4232), CLASS III (506) AND CLASS IV (828) RESINS
TENSILE MODULUS PSI, X10^6
5000
4000
3000
2000
1000
LOAD DIRECTION PARALLEL TO WARP DIRECTION FOR ALL CONDITIONS
- 120 CLOTH
- 183 CLOTH
R.T. - CLASS IV (828)
- SECONDARY MODULUS
- PRIMARY MODULUS
- ULTIMATE STRENGTH
R.T. - CLASS III (506)
- SECONDARY MODULUS
- PRIMARY MODULUS
- ULTIMATE STRENGTH
500° - 1/2 HR. AT 500° - CLASS II (4232)
- PRIMARY MODULUS
- ULTIMATE STRENGTH
R.T. - CLASS II (4232)
- SECONDARY MODULUS
- PRIMARY MODULUS
- ULTIMATE STRENGTH
R.T. - CLASS IV (828)
- SECONDARY MODULUS
- PRIMARY MODULUS
- ULTIMATE STRENGTH
R.T. - CLASS III (506)
- SECONDARY MODULUS
- PRIMARY MODULUS
- ULTIMATE STRENGTH
500° - 1/2 HR. AT 500° - CLASS II (4232)
- SECONDARY MODULUS
- PRIMARY MODULUS
- ULTIMATE STRENGTH
R.T. - CLASS II (4232)
- SECONDARY MODULUS
- PRIMARY MODULUS
- ULTIMATE STRENGTH
ULTIMATE TENSILE STRESS (K.S.I.)
50
40
30
20
10
0

FIGURE 10




FW 156—3-54

FIGURE 11

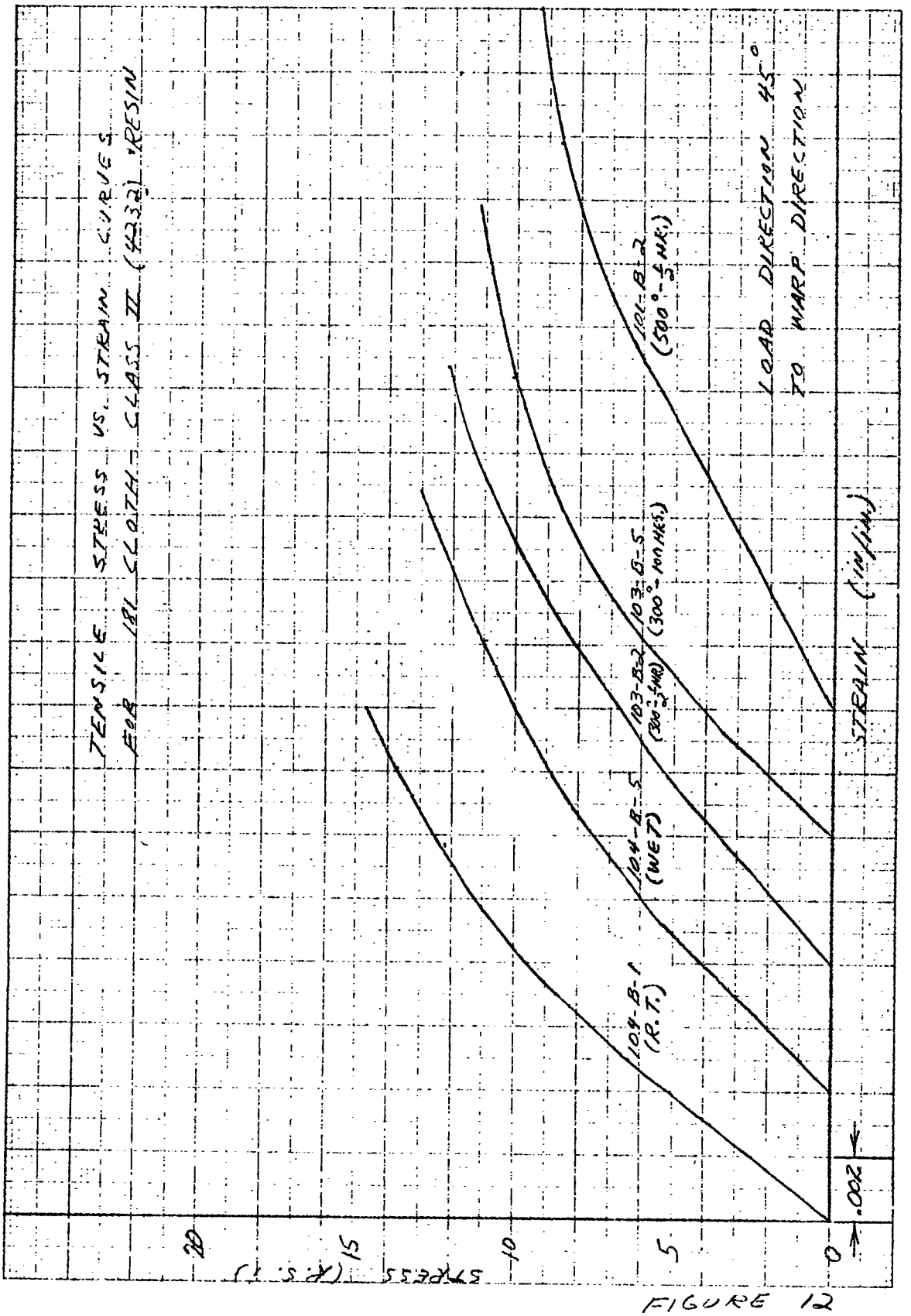

TENSILE STRESS VS. STRAIN CURVES
FOR 181 CLOTH - CLASS II (4232) RESIN
LOAD DIRECTION 45°
TO WARP DIRECTION
101-B-2
(500°-½ HR.)
103-B-5
(300°-100 HRS.)
103-B-2
(300°-½ HR)
104-B-5
(WET)
104-B-1
(R.T.)
STRAIN (in/in.)
.002
STRESS (P.S.I.)
20
15
10
5
0

FIGURE 12

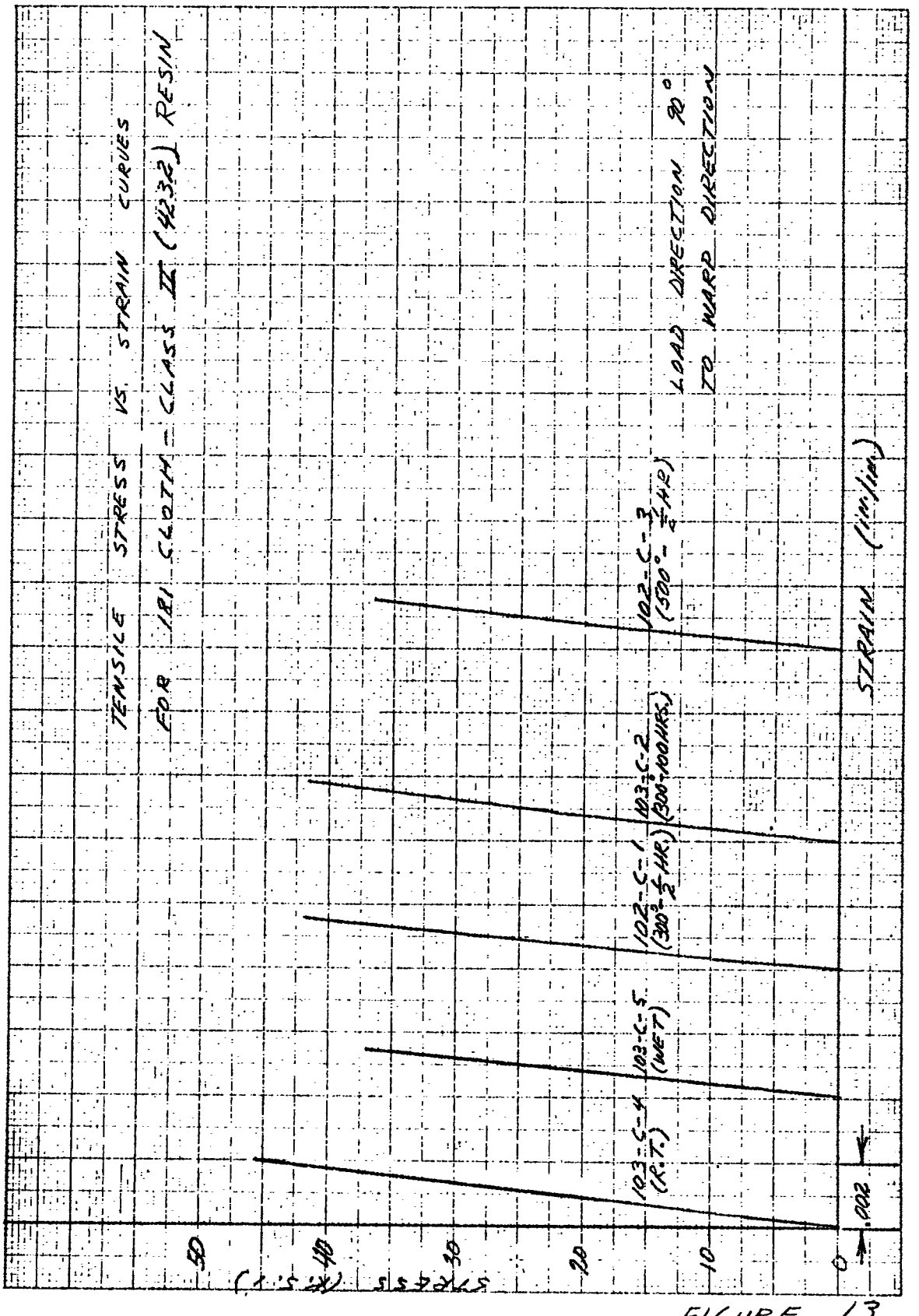

TENSILE STRESS VS. STRAIN CURVES
FOR 181 CLOTH - CLASS II (4232) RESIN
LOAD DIRECTION 90°
TO WARP DIRECTION
102-C-3 (500° - 1/2 HR)
103-C-2 (300°-100 HRS.)
102-C-1 (300° - 1/2 HR.)
103-C-5 (WET)
103-C-4 (R.T.)
STRAIN (in./in.)
.002
STRESS (K.S.I.)
0
10
20
30
40
50

FIGURE 13

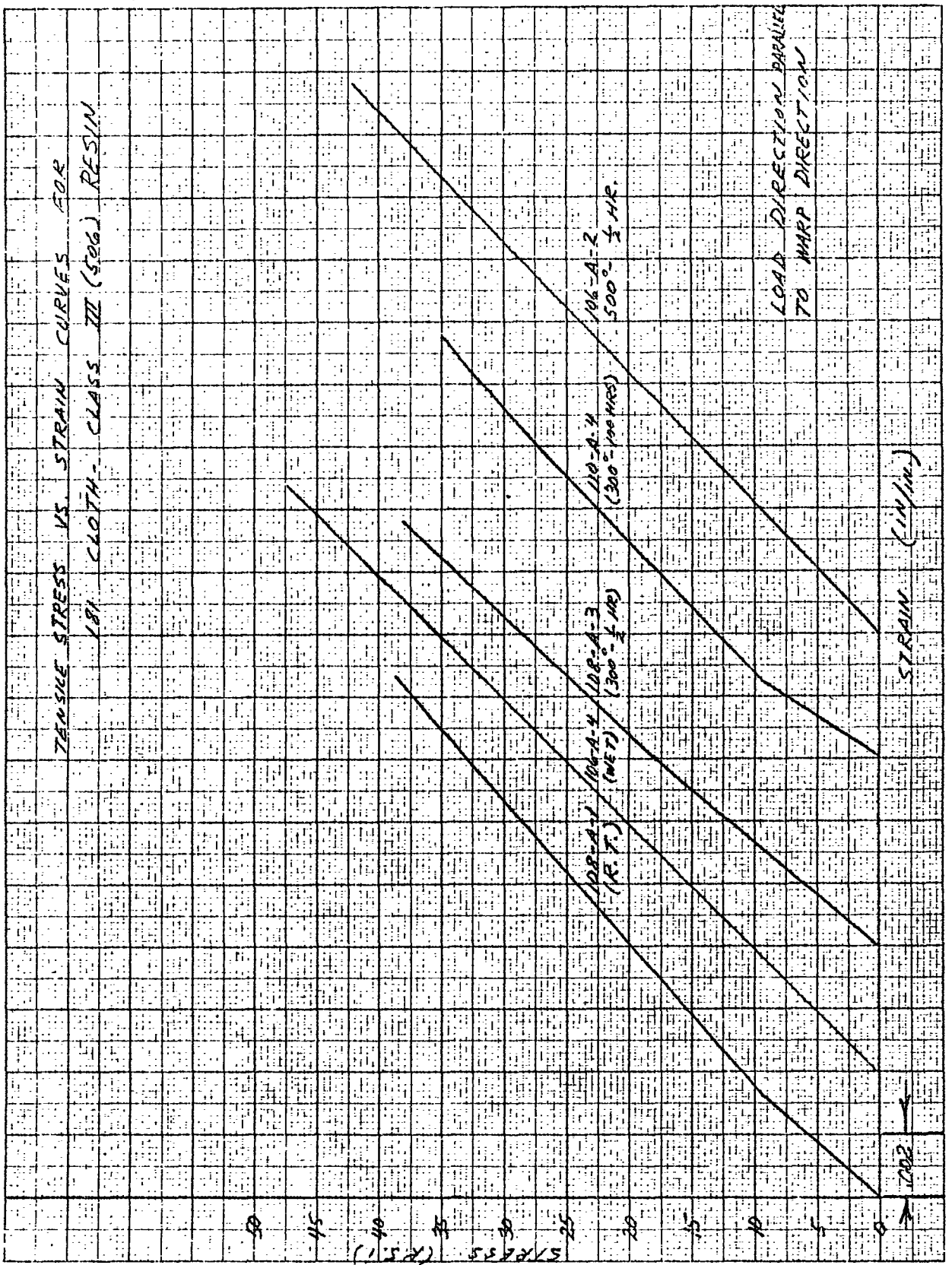

TENSILE STRESS VS. STRAIN CURVES FOR
181 CLOTH - CLASS III (506) RESIN
LOAD DIRECTION PARALLEL
TO WARP DIRECTION
106-A-2
500° - ½ HR.
110-A-4
(300° - 100 HRS)
108-A-3
(300° - ½ HR)
106-A-4
(WET)
108-A-1
(R.T.)
STRAIN (IN/IN.)
.002
STRESS (P.S.I.)
50
45
40
35
30
25
20
15
10
5
0

FIGURE 14

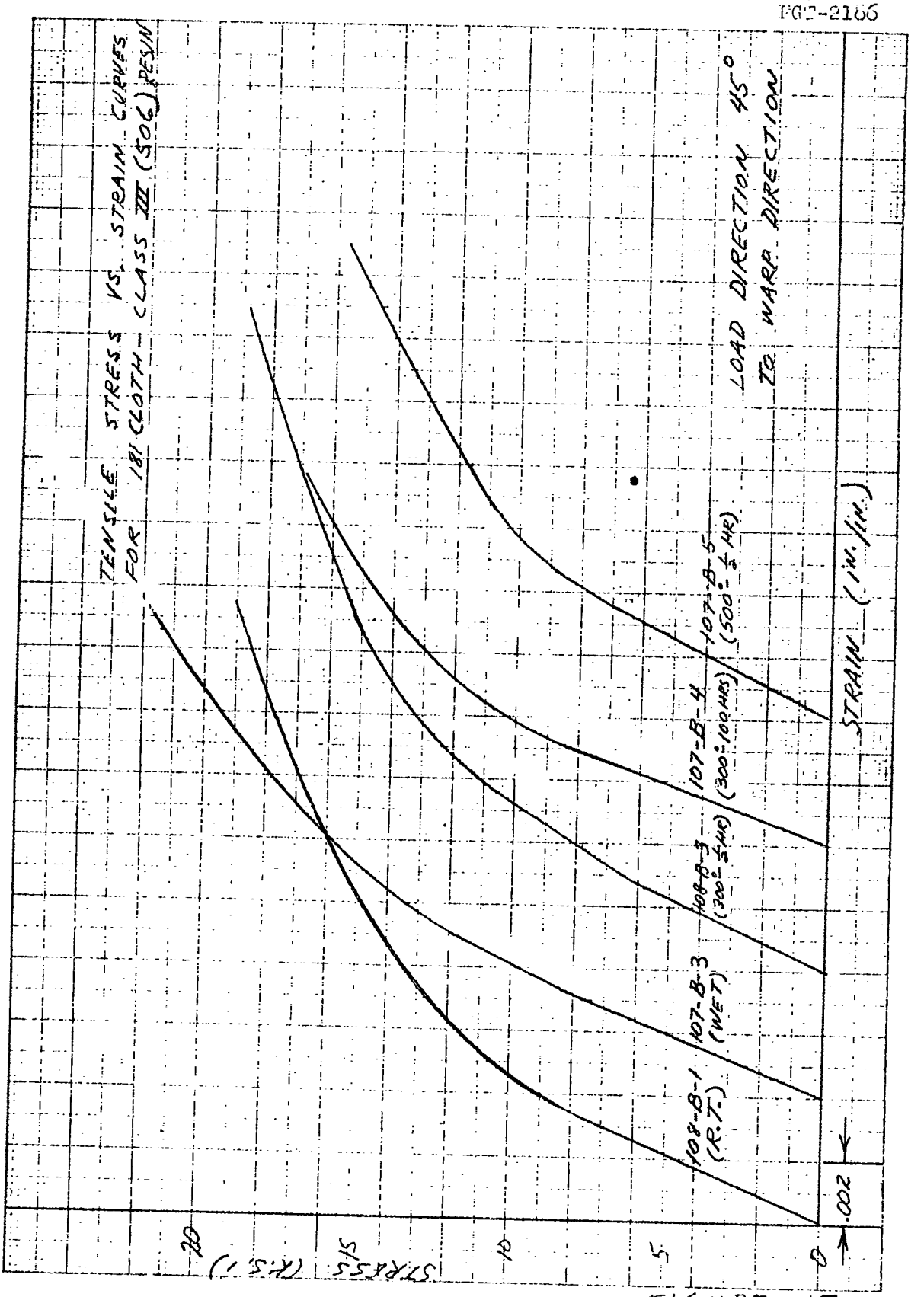

TENSILE STRESS VS. STRAIN CURVES
FOR 181 CLOTH - CLASS III (506) RESIN
LOAD DIRECTION 45°
TO WARP DIRECTION
108-B-1 (R.T.)
107-B-3 (WET)
108-B-3 (300° - 1/2 HR)
107-B-4 (300° - 100 HRS)
107-B-5 (500° - 1/2 HR)
STRAIN (IN./IN.)
.002
STRESS (K.S.I.)
0
5
10
15
20

FIGURE 15

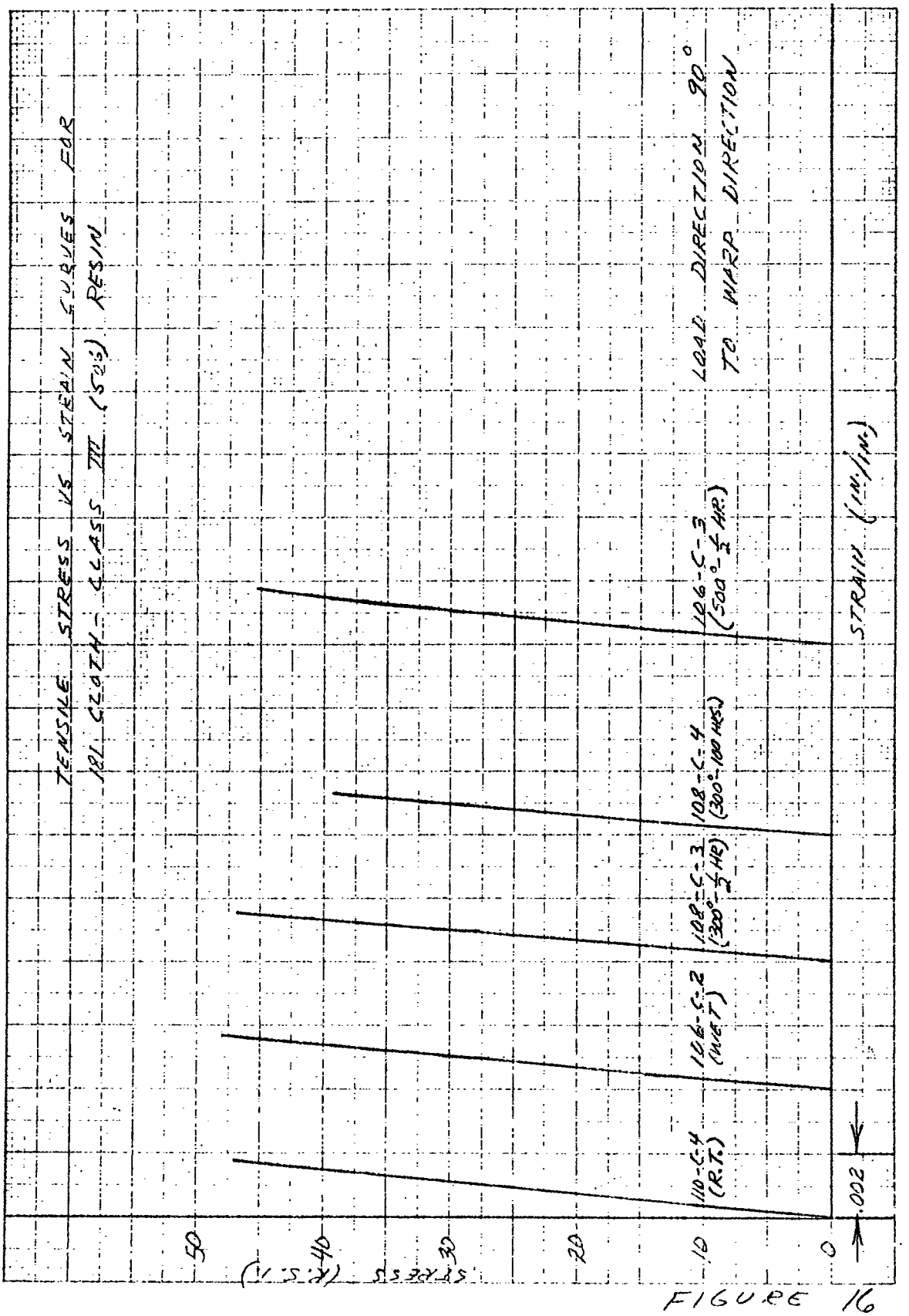

TENSILE STRESS VS STRAIN CURVES FOR
181 CLOTH - GLASS III (S2) RESIN
STRESS (K.S.I.)
50
40
30
20
10
0
.002
STRAIN (IN./IN.)
110-C-4 (R.T.)
106-C-2 (WET)
108-C-3 (300°-½ HR)
108-C-4 (300°-100 HRS)
106-C-3 (500°-½ HR)
LOAD DIRECTION 90° TO WARP DIRECTION

FIGURE 16

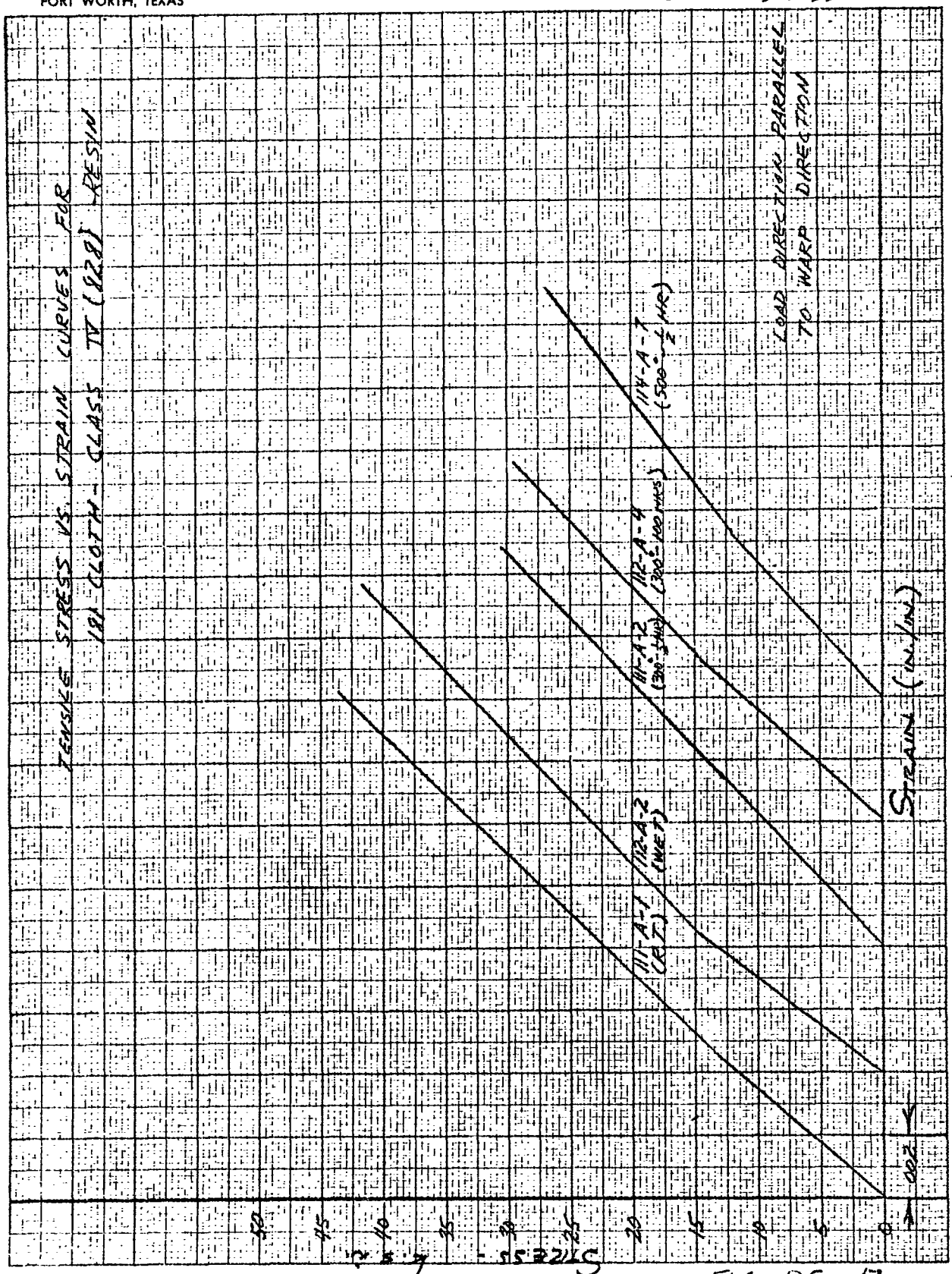

TENSILE STRESS VS. STRAIN CURVES FOR
181 CLOTH - CLASS IV (828) RESIN
LOAD DIRECTION PARALLEL
TO WARP DIRECTION
114-A-7
112-A-4
111-A-2
112-A-2
111-A-1
(RT.)
(WET)
STRAIN (IN./IN.)
.002
STRESS - K.S.I.
50
45
40
35
30
25
20
15
10
5
0

FIGURE 17

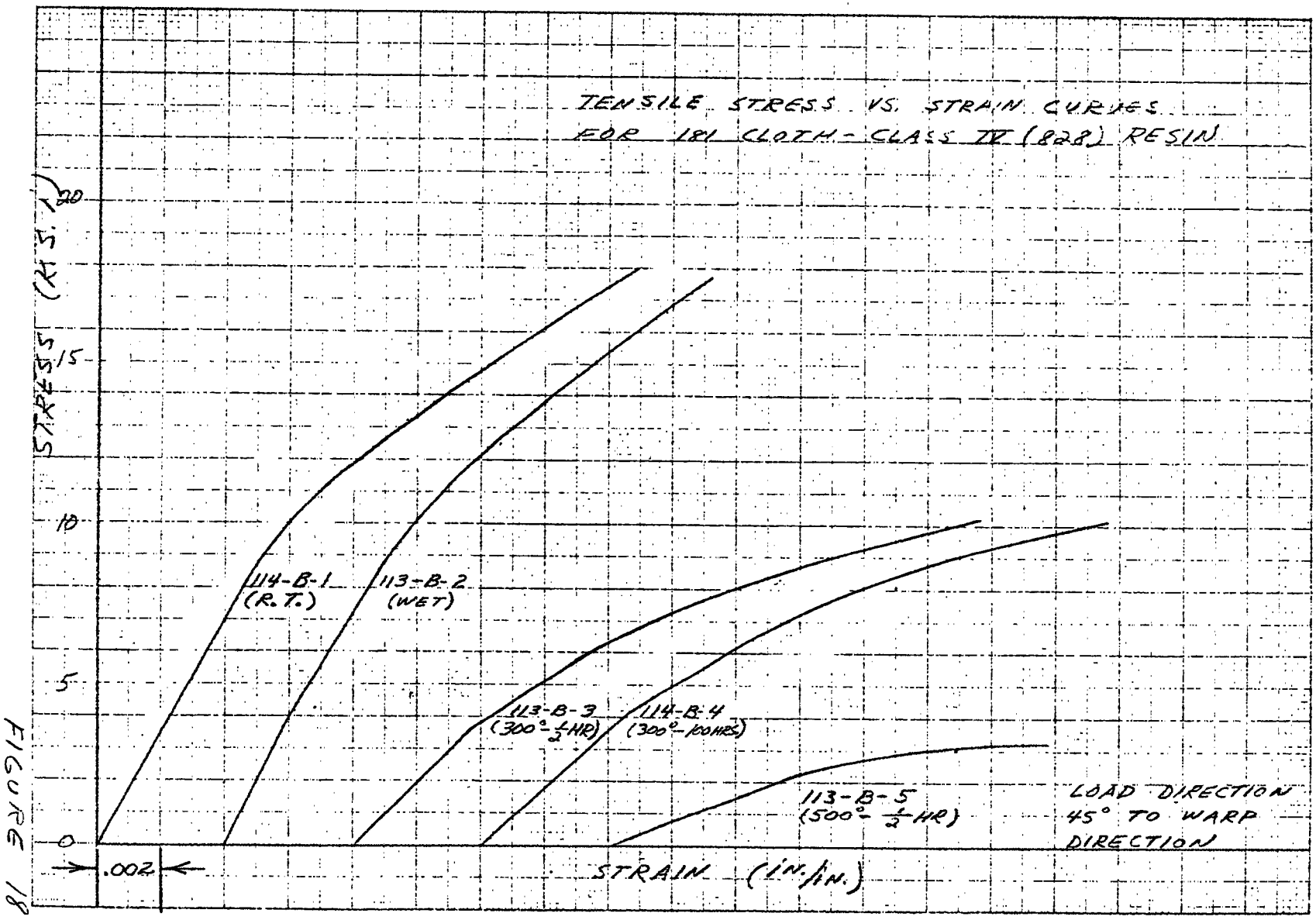

TENSILE STRESS VS. STRAIN CURVES
FOR 181 CLOTH - CLASS IV (828) RESIN
STRESS (KSI.)
20
15
10
5
0
.002
STRAIN (IN./IN.)
114-B-1
(R.T.)
113-B-2
(WET)
113-B-3
(300° - ½ HR)
114-B-4
(300° - 100 HRS.)
113-B-5
(500° - ½ HR)
LOAD DIRECTION
45° TO WARP
DIRECTION

FIGURE 18

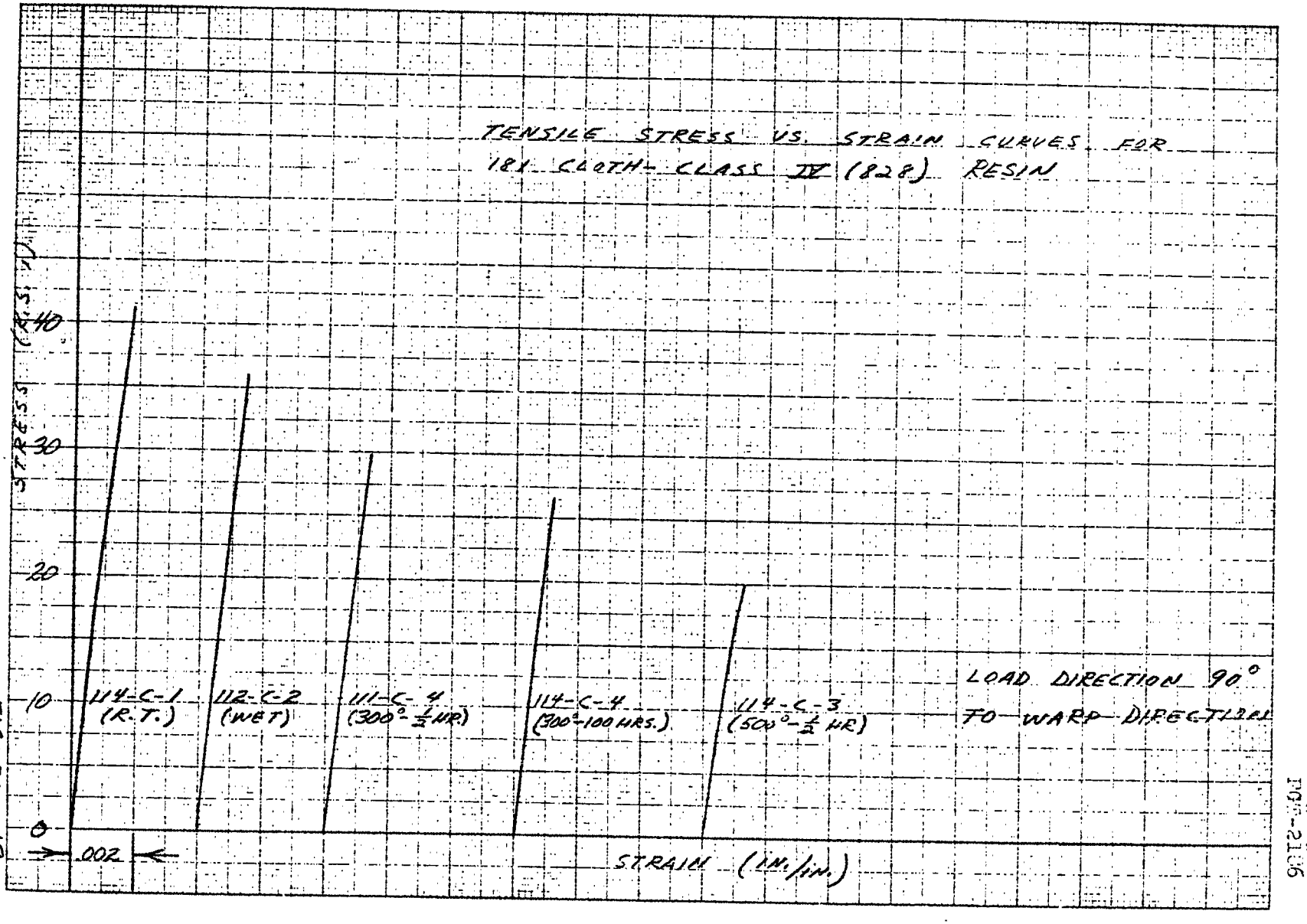
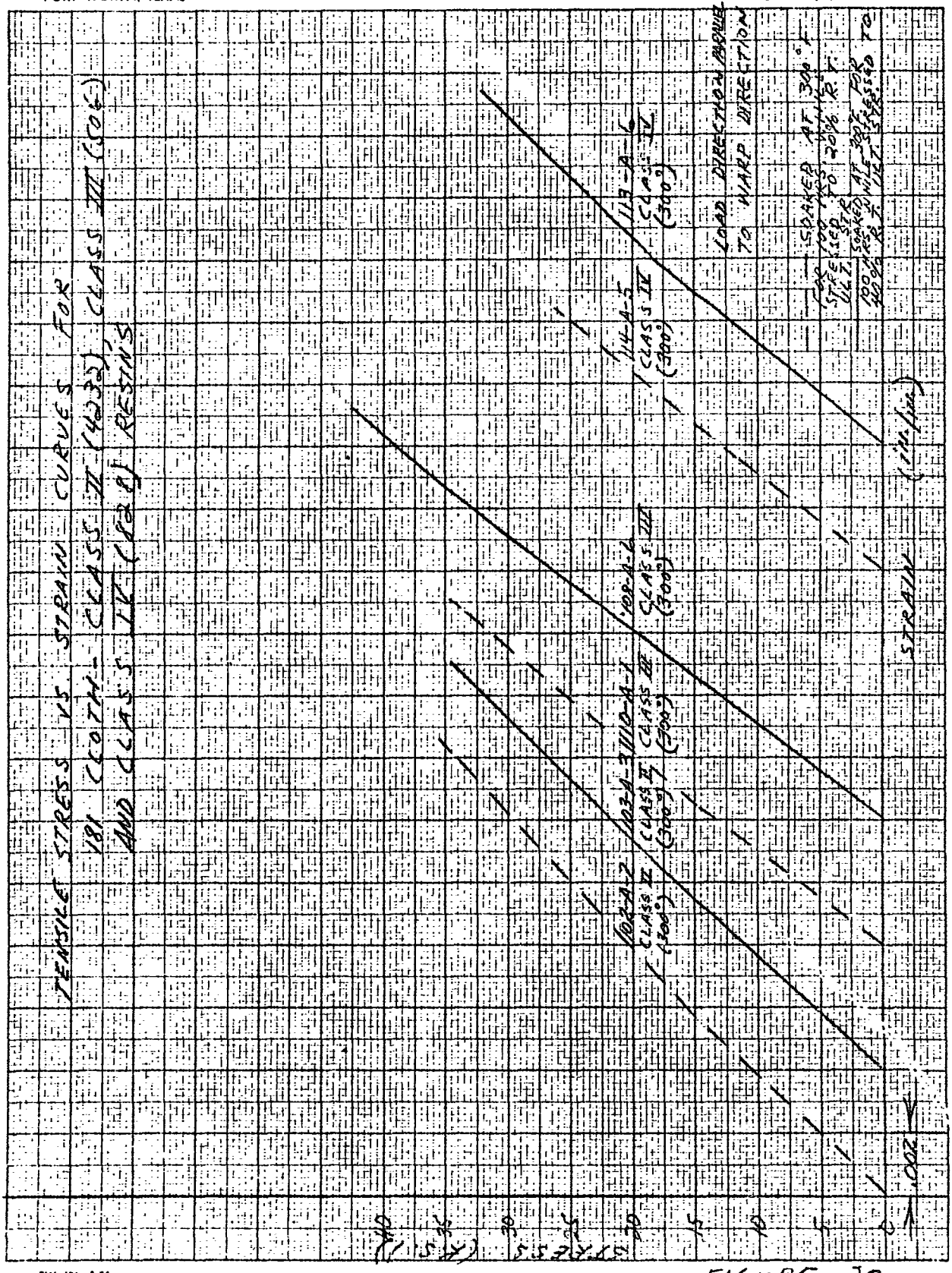

TENSILE STRESS VS. STRAIN CURVES FOR
181 CLOTH - CLASS III (828) RESIN
STRESS (K.S.I.)
40
30
20
10
0
.002
STRAIN (IN./IN.)
114-C-1 (R.T.)
112-C-2 (WET)
111-C-4 (300° - ½ HR)
114-C-4 (300° - 100 HRS.)
114-C-3 (500° - ½ HR)
LOAD DIRECTION 90°
TO WARP DIRECTION

FIGURE 19




FW 156—3-54

FIGUEE 20

FW 156—3-54

FIGURE 31

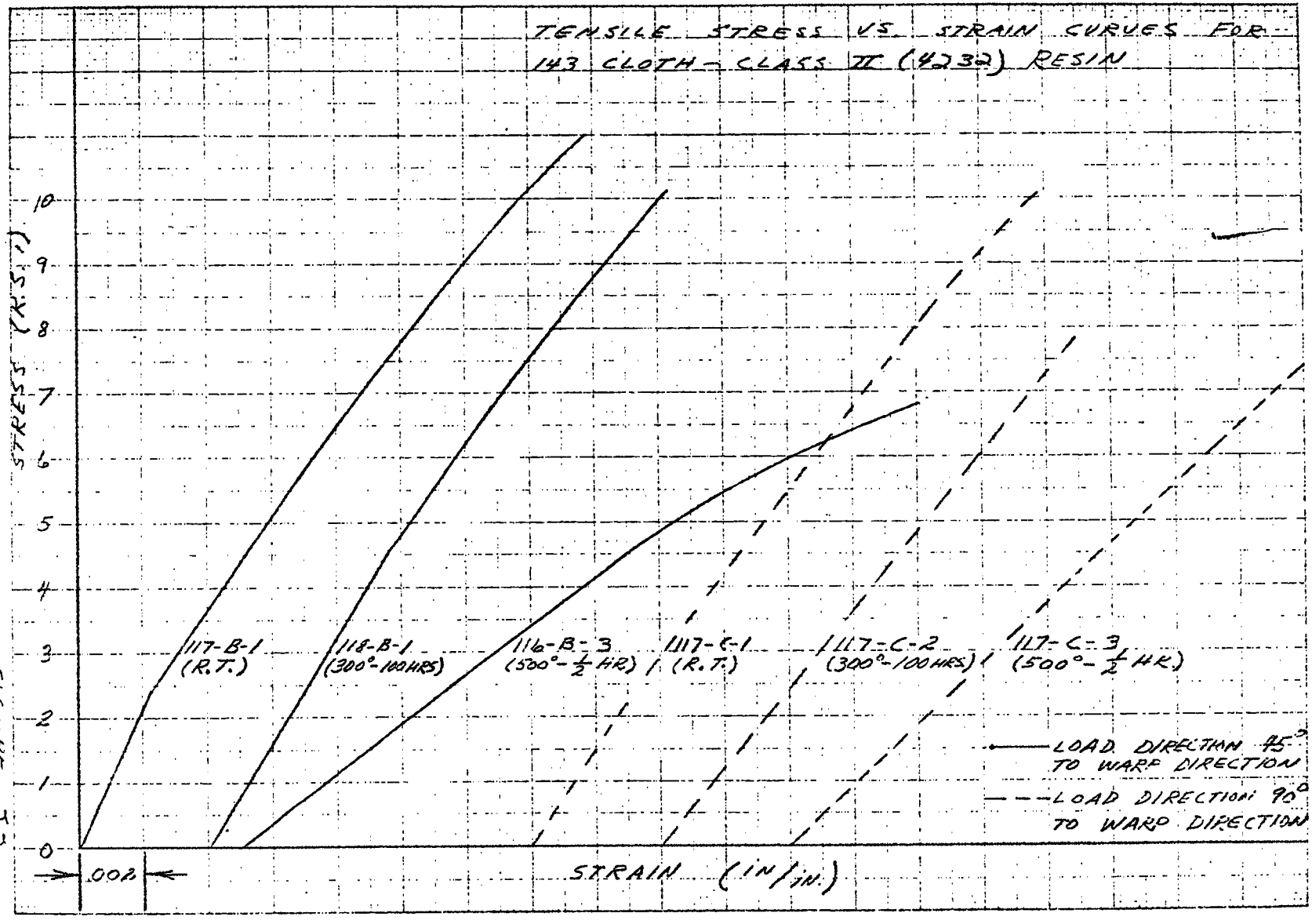

TENSILE STRESS VS. STRAIN CURVES FOR
143 CLOTH - CLASS II (4232) RESIN
STRESS (K.S.I.)
STRAIN (IN/IN.)
.002
117-B-1 (R.T.)
118-B-1 (300°-100 HRS)
116-B-3 (500°-½ HR)
1117-C-1 (R.T.)
117-C-2 (300°-100 HRS)
117-C-3 (500°-½ HR.)
LOAD DIRECTION 45° TO WARP DIRECTION
LOAD DIRECTION 90° TO WARP DIRECTION

FIGURE 32

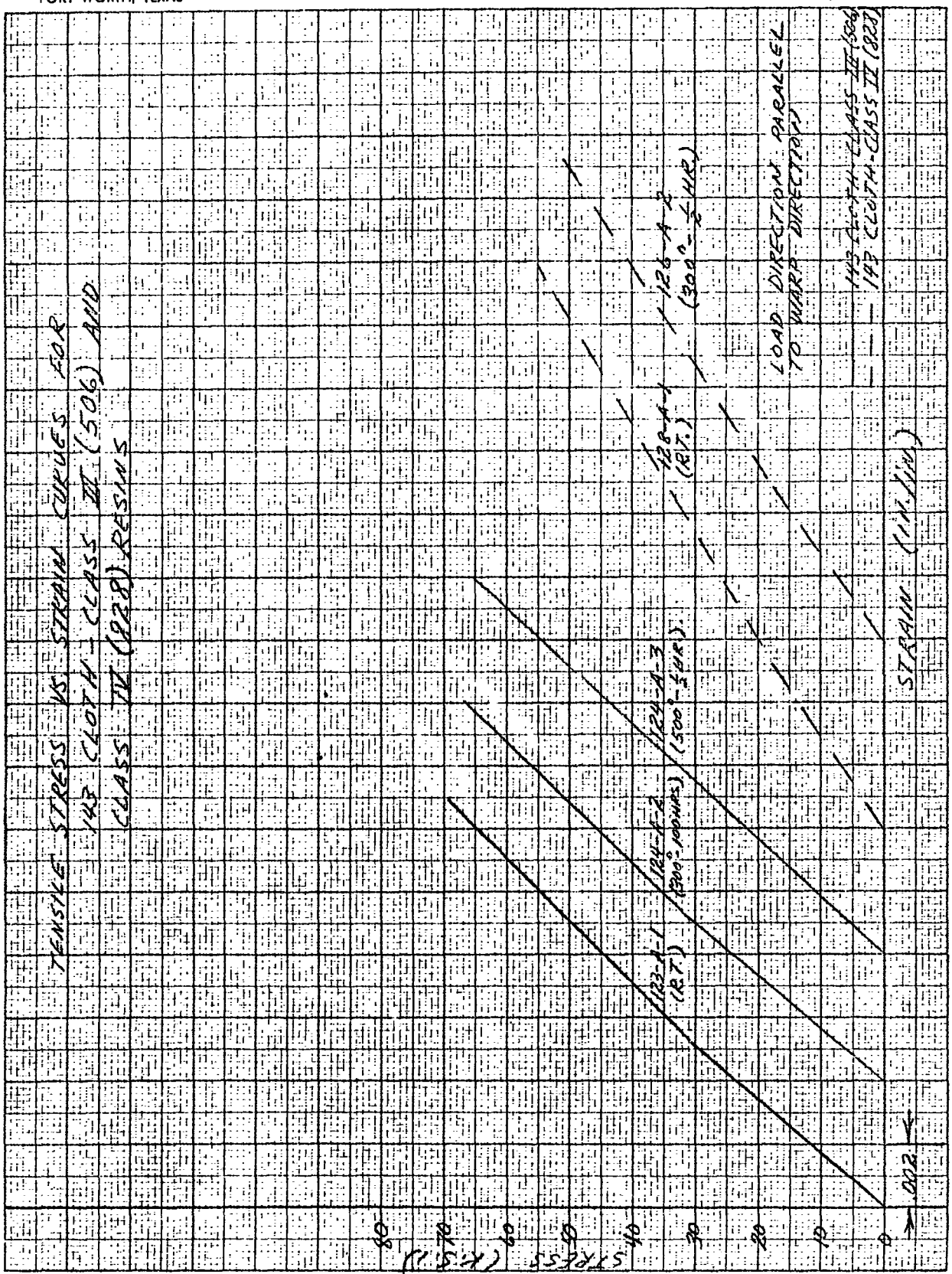
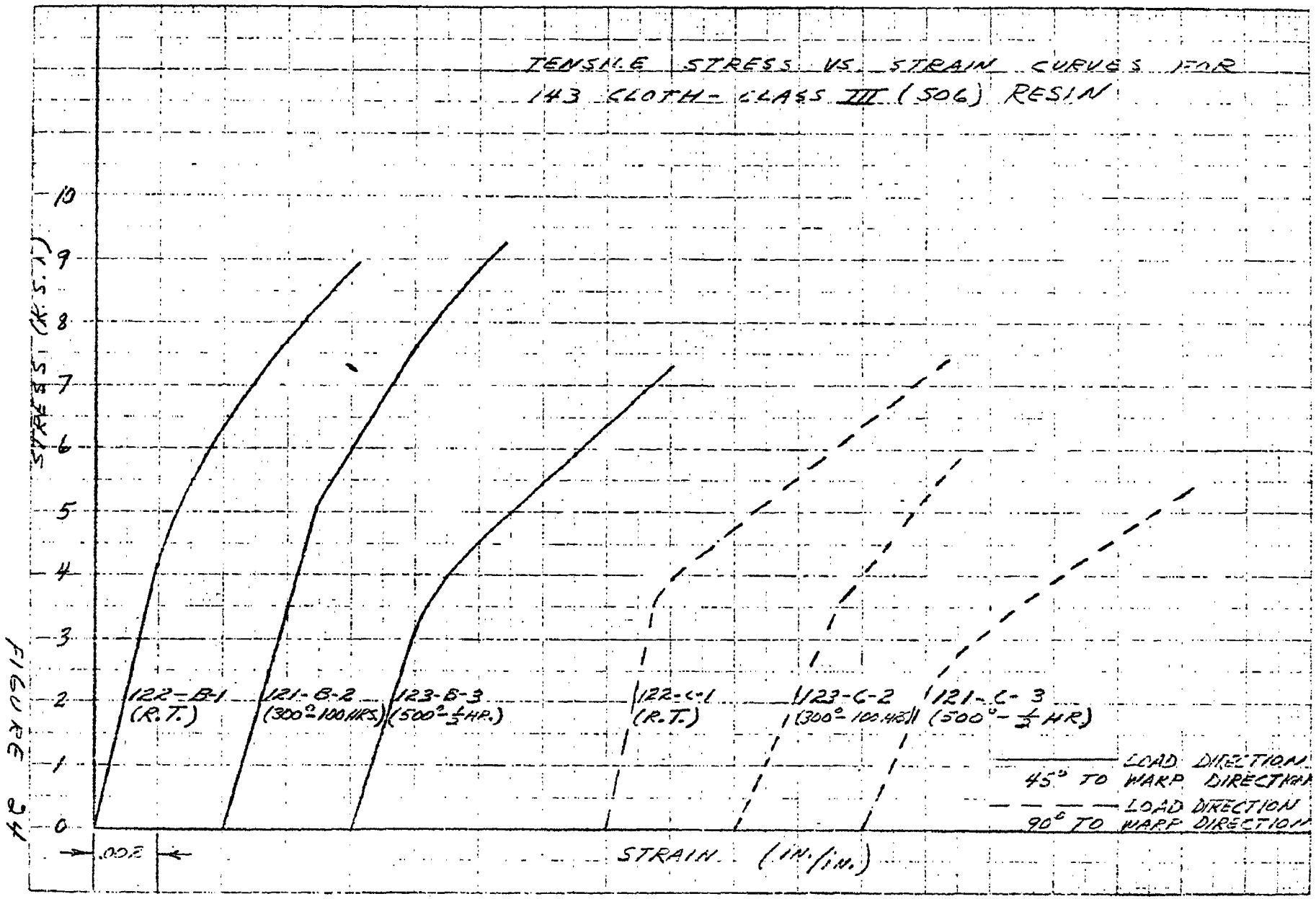

TENSILE STRESS VS. STRAIN CURVES FOR
143 CLOTH - CLASS III (506) AND
CLASS IV (828) RESINS
LOAD DIRECTION PARALLEL
TO WARP DIRECTION
143 CLOTH-CLASS III (506)
143 CLOTH-CLASS II (828)
123-A-1 (R.T.)
124-A-2 (300°-100 HRS)
124-A-3 (500°-½ HR)
128-A-1 (R.T.)
126-A-2 (300°-½ HR)
STRAIN (IN./IN.)
.002
STRESS (K.S.I.)
0
10
20
30
40
50
60
70
80

FIGURE 23


TENSILE STRESS VS STRAIN CURVES FOR
143 CLOTH - CLASS III (506) RESIN
STRESS (K.S.I.)
FIGURE 44
10
9
8
7
6
5
4
3
2
1
0
.005
STRAIN (IN./IN.)
122-B-1 (R.T.)
121-B-2 (300°-100 HRS.)
123-B-3 (500°-½ HR.)
122-C-1 (R.T.)
123-C-2 (300°-100 HRS.)
121-C-3 (500°-½ HR.)
LOAD DIRECTION 45° TO WARP DIRECTION
LOAD DIRECTION 90° TO WARP DIRECTION

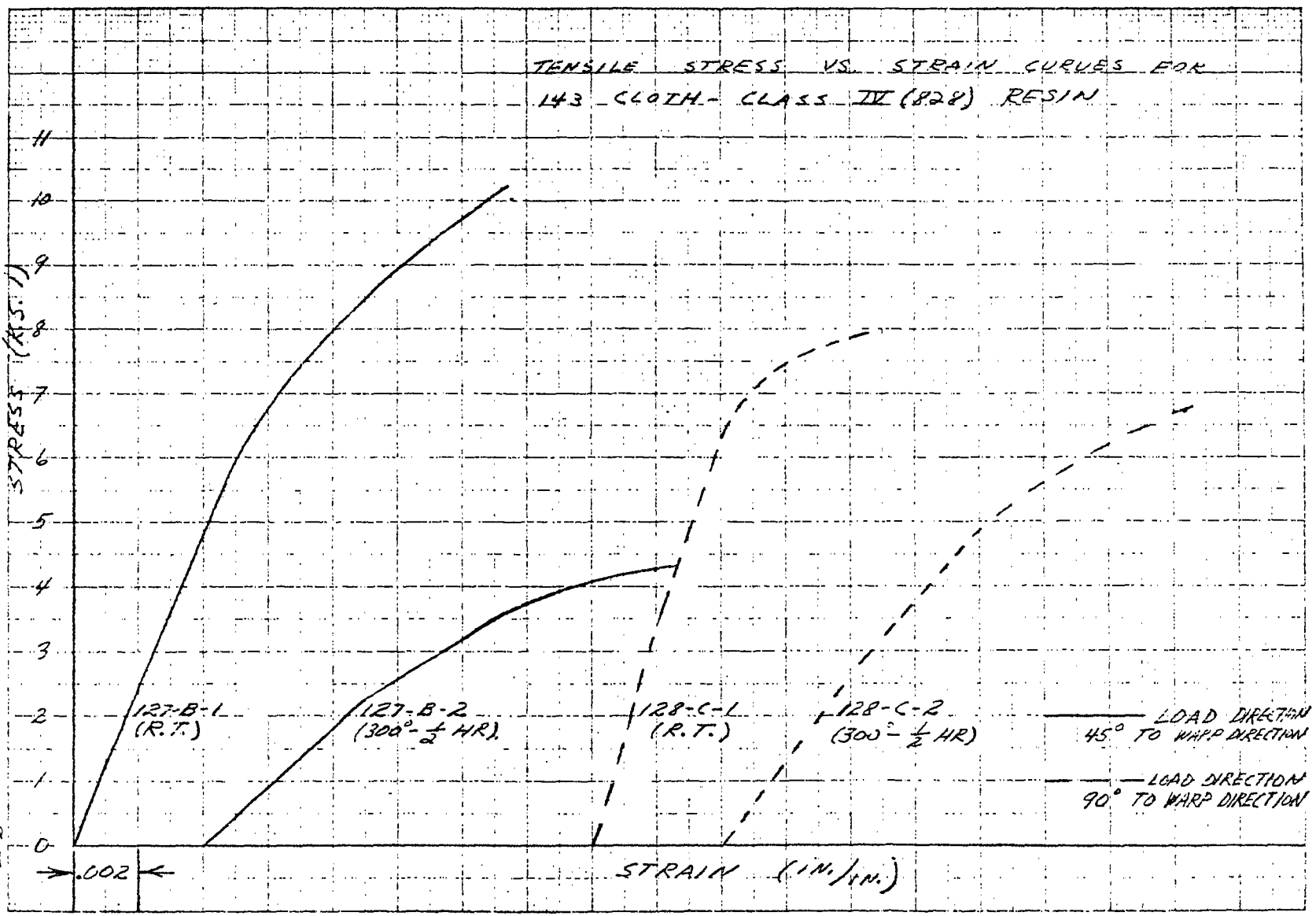

TENSILE STRESS VS. STRAIN CURVES FOR
143 CLOTH - CLASS III (828) RESIN
STRESS (KS.I.)
0
1
2
3
4
5
6
7
8
9
10
11
.002
STRAIN (IN./IN.)
127-B-1
(R.T.)
127-B-2
(300° - ½ HR).
128-C-1
(R.T.)
128-C-2
(300° - ½ HR)
LOAD DIRECTION
45° TO WARP DIRECTION
LOAD DIRECTION
90° TO WARP DIRECTION

FIGURE 25

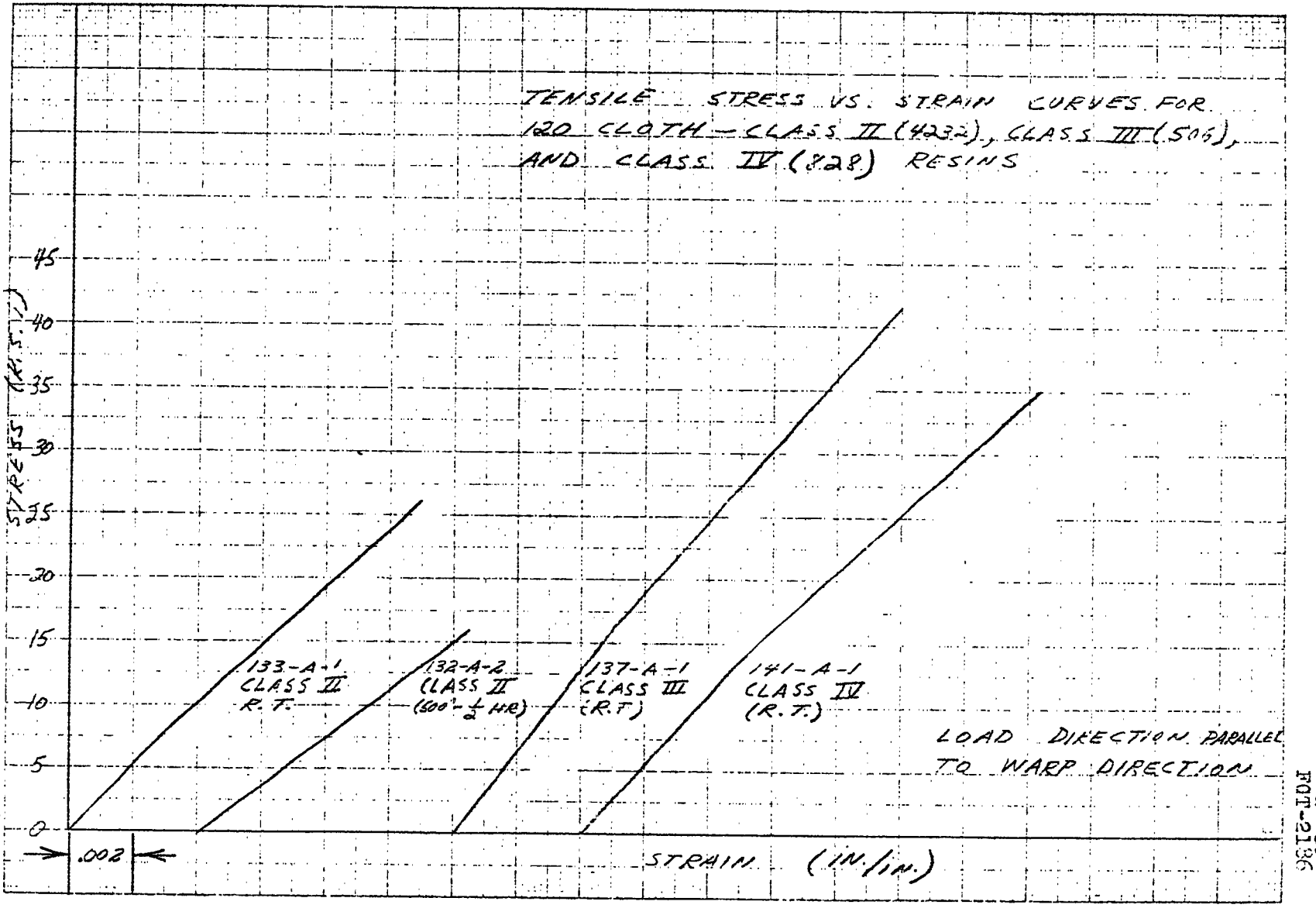

TENSILE STRESS VS. STRAIN CURVES FOR
120 CLOTH — CLASS II (4232), CLASS III (506),
AND CLASS IV (828) RESINS
STRESS (KPSI)
45
40
35
30
25
20
15
10
5
0
.002
STRAIN (IN./IN.)
133-A-1
CLASS II
R.T.
132-A-2
(CLASS II
(600°-½ HR)
137-A-1
CLASS III
(R.T.)
141-A-1
CLASS IV
(R.T.)
LOAD DIRECTION PARALLEL
TO WARP DIRECTION

FIGURE 20

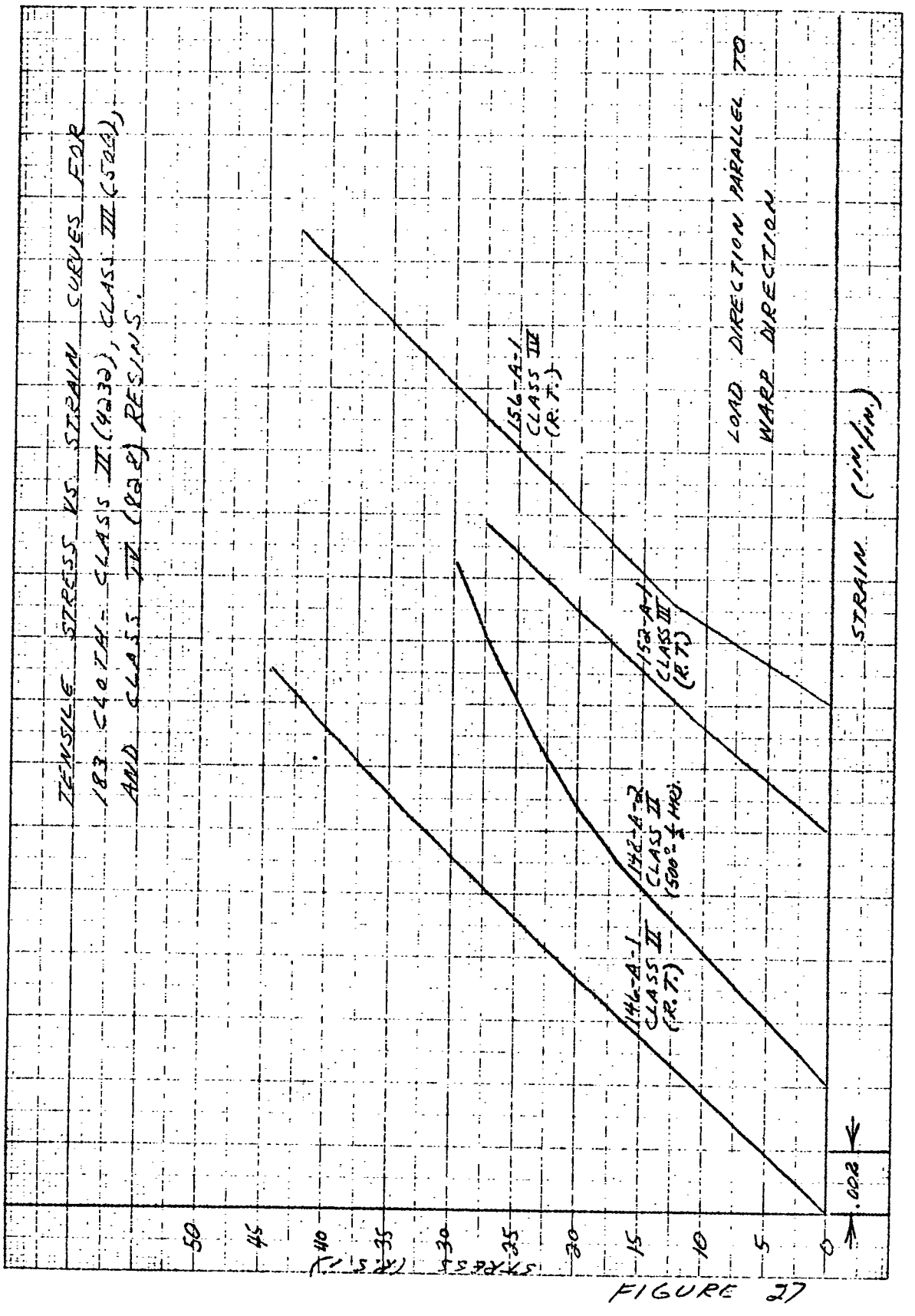
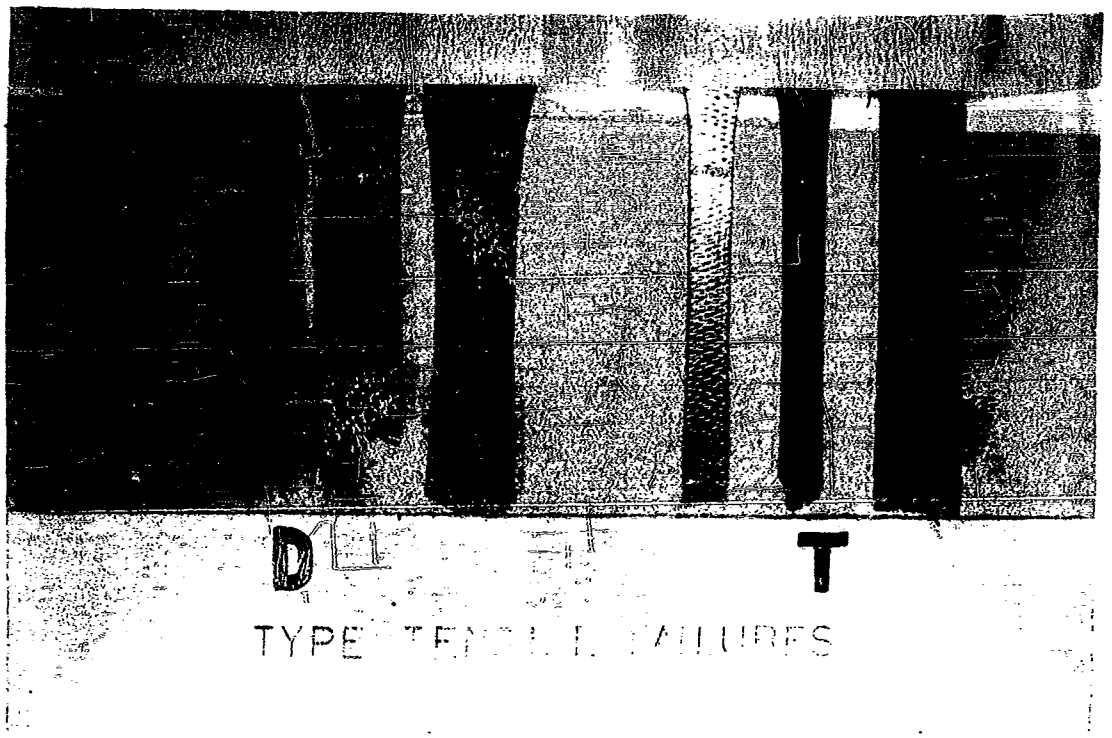

TENSILE STRESS VS STRAIN CURVES FOR
183 CLOTH - CLASS II (4232), CLASS III (500),
AND CLASS IV (828) RESINS.
LOAD DIRECTION PARALLEL TO
WARP DIRECTION
156-A-1
CLASS III
(R.T.)
152-A-1
CLASS III
(R.T.)
148-A-2
CLASS II
(500° ½ HR)
146-A-1
CLASS II
(R.T.)
STRAIN (IN./IN.)
.002
STRESS (P.S.I.)
50
45
40
35
30
25
20
15
10
5
0

FIGURE 27



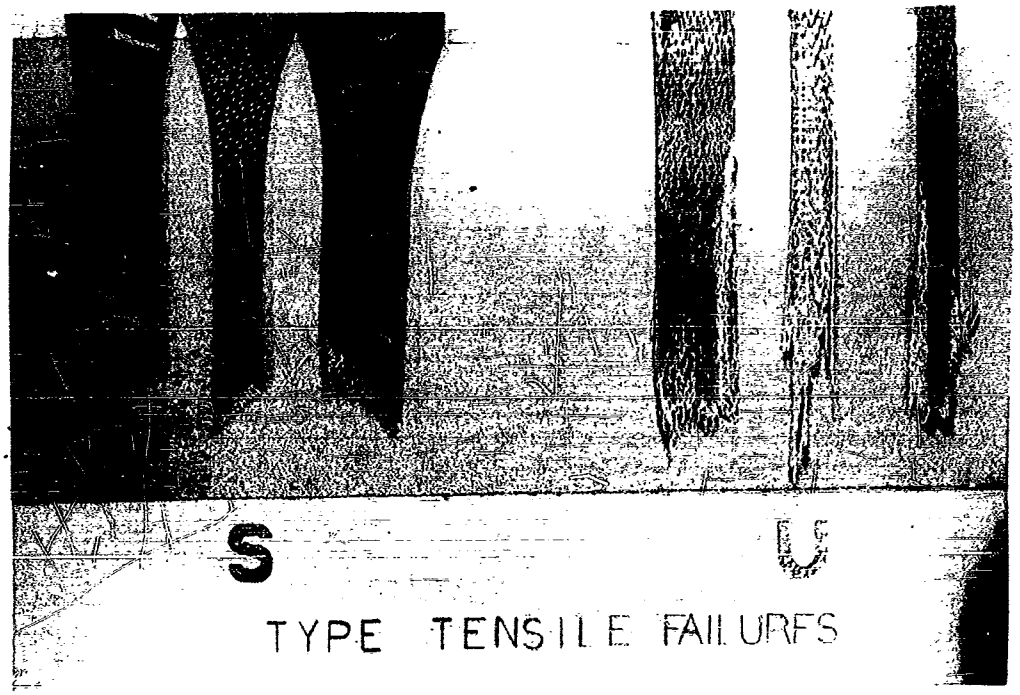

Mag. 1X

Typical Failure From Tensile Tests.

D (Delamination) seemed to fail at the bond between cloths.

T (Tension) failed across the specimen without delaminating.

Figure 28-1




Mag. 1X

Typical Failures From Tensile Tests.

S (Shear) failed on an angle of approximately 45° without delaminating.

U (Unidirectional) fibrous type failure observed only on specimens made using 143 type cloth.

Figure 28-2

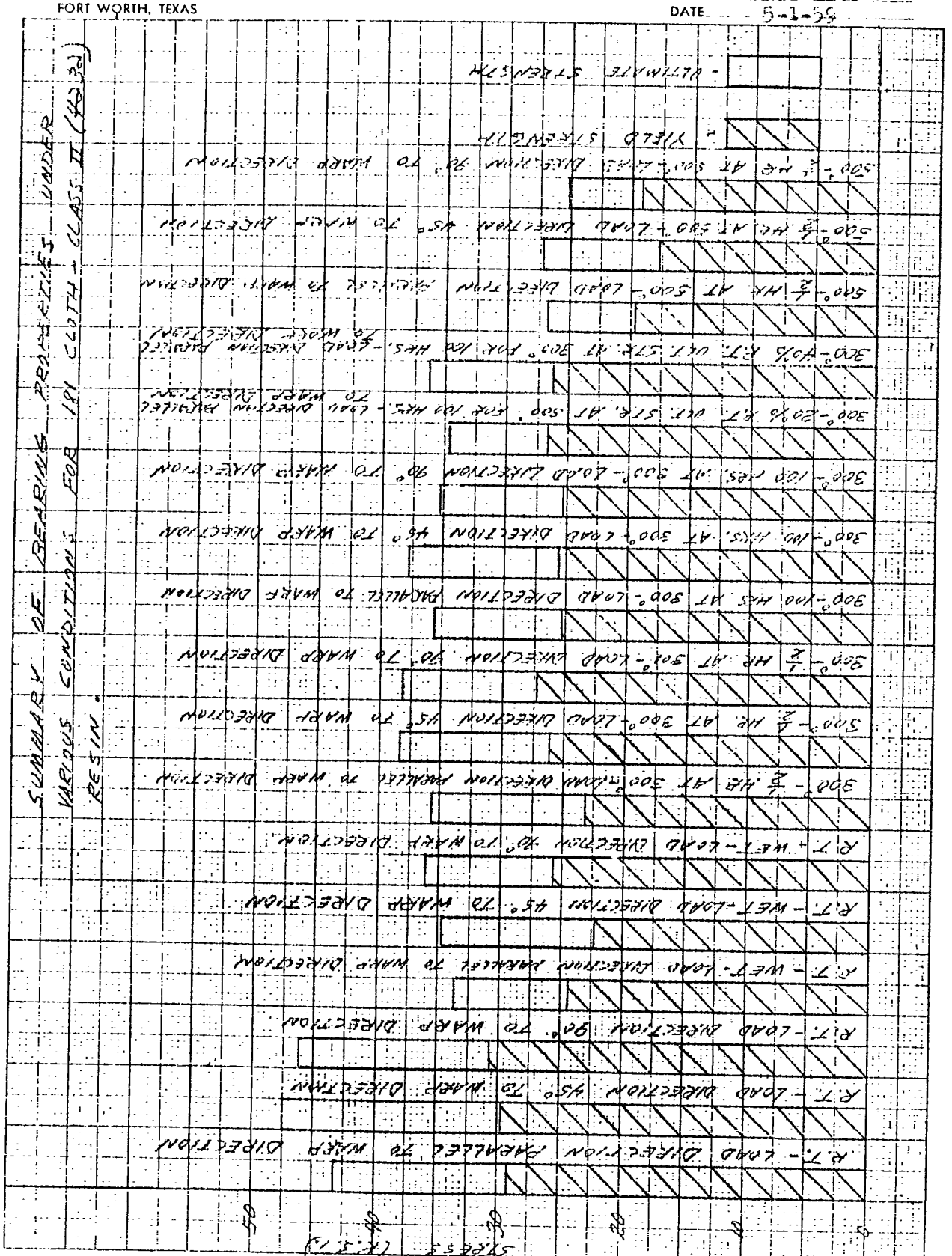

SUMMARY OF BEARING PROPERTIES UNDER VARIOUS CONDITIONS FOR 181 CLOTH - CLASS II (4232) RESIN.
R.T. - LOAD DIRECTION PARALLEL TO WARP DIRECTION
R.T. - LOAD DIRECTION 45° TO WARP DIRECTION
R.T. - LOAD DIRECTION 90° TO WARP DIRECTION
R.T. - WET - LOAD DIRECTION PARALLEL TO WARP DIRECTION
R.T. - WET - LOAD DIRECTION 45° TO WARP DIRECTION
R.T. - WET - LOAD DIRECTION 90° TO WARP DIRECTION
300° - 1/2 HR AT 300° - LOAD DIRECTION PARALLEL TO WARP DIRECTION
300° - 1/2 HR AT 300° - LOAD DIRECTION 45° TO WARP DIRECTION
300° - 1/2 HR AT 300° - LOAD DIRECTION 90° TO WARP DIRECTION
300° - 100 HRS. AT 300° - LOAD DIRECTION PARALLEL TO WARP DIRECTION
300° - 100 HRS. AT 300° - LOAD DIRECTION 45° TO WARP DIRECTION
300° - 100 HRS. AT 300° - LOAD DIRECTION 90° TO WARP DIRECTION
300° - 20% R.T. ULT. STR. AT 300° FOR 100 HRS. - LOAD DIRECTION PARALLEL TO WARP DIRECTION
300° - 40% R.T. ULT. STR. AT 300° FOR 100 HRS. - LOAD DIRECTION PARALLEL TO WARP DIRECTION
500° - 1/2 HR AT 500° - LOAD DIRECTION PARALLEL TO WARP DIRECTION
500° - 1/2 HR AT 500° - LOAD DIRECTION 45° TO WARP DIRECTION
500° - 1/2 HR AT 500° - LOAD DIRECTION 90° TO WARP DIRECTION
YIELD STRENGTH
ULTIMATE STRENGTH
STRESS (K.S.I.)
0
10
20
30
40
50

FIGURE 29

SUMMARY OF BEARING PROPERTIES UNDER VARIOUS CONDITIONS FOR 181 CLOTH - CLASS III (1505) RESIN
STRESS (KSI)
50
40
30
20
10
0
R.T. - LOAD DIRECTION PARALLEL TO WARP DIRECTION
R.T. - LOAD DIRECTION 45° TO WARP DIRECTION
R.T. + LOAD DIRECTION 90° TO WARP DIRECTION
R.T. - WET - LOAD DIRECTION PARALLEL TO WARP DIRECTION
R.T. - WET - LOAD DIRECTION 45° TO WARP DIRECTION
R.T. + WET - LOAD DIRECTION 90° TO WARP DIRECTION
300° - ½ HR AT 300° - LOAD DIRECTION PARALLEL TO WARP DIRECTION
300° - ½ HR AT 300° - LOAD DIRECTION 45° TO WARP DIRECTION
300° - ½ HR AT 300° - LOAD DIRECTION 90° TO WARP DIRECTION
300° - 100 HRS AT 300° - LOAD DIRECTION PARALLEL TO WARP DIRECTION
300° - 100 HRS AT 300° - LOAD DIRECTION 45° TO WARP DIRECTION
300° - 100 HRS AT 300° - LOAD DIRECTION 90° TO WARP DIRECTION
300° - 20% R.T. ULT. STR AT 300° FOR 100 HRS. - LOAD DIRECTION PARALLEL TO WARP DIRECTION
300° - 40% R.T. ULT. STR AT 300° FOR 100 HRS. - LOAD DIRECTION PARALLEL TO WARP DIRECTION
500° - ½ HR AT 500° - LOAD DIRECTION PARALLEL TO WARP DIRECTION
500° - ½ HR AT 500° - LOAD DIRECTION 45° TO WARP DIRECTION
500° - ½ HR AT 500° - LOAD DIRECTION 90° TO WARP DIRECTION
- YIELD STRENGTH
- ULTIMATE STRENGTH

FIGURE 30

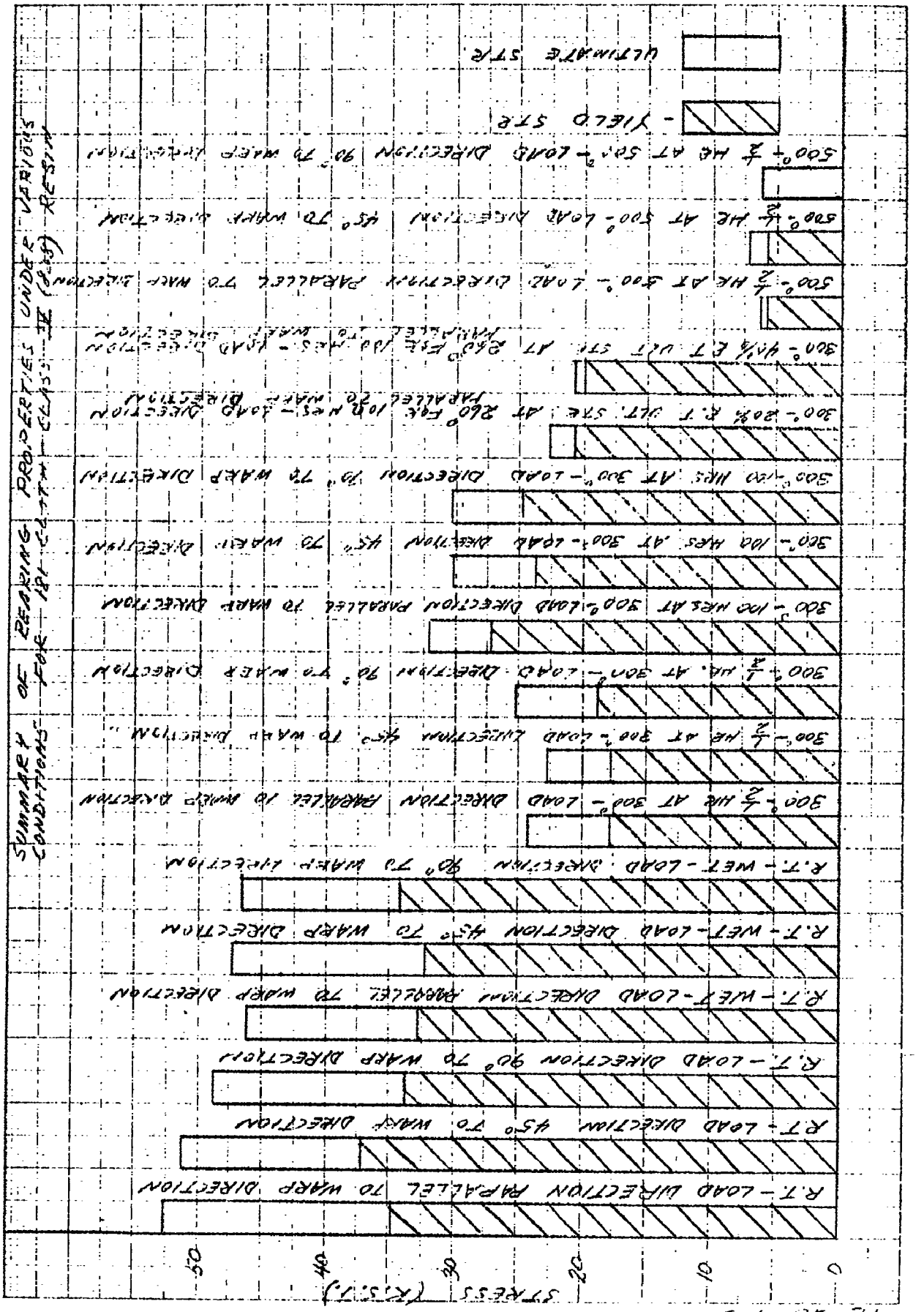
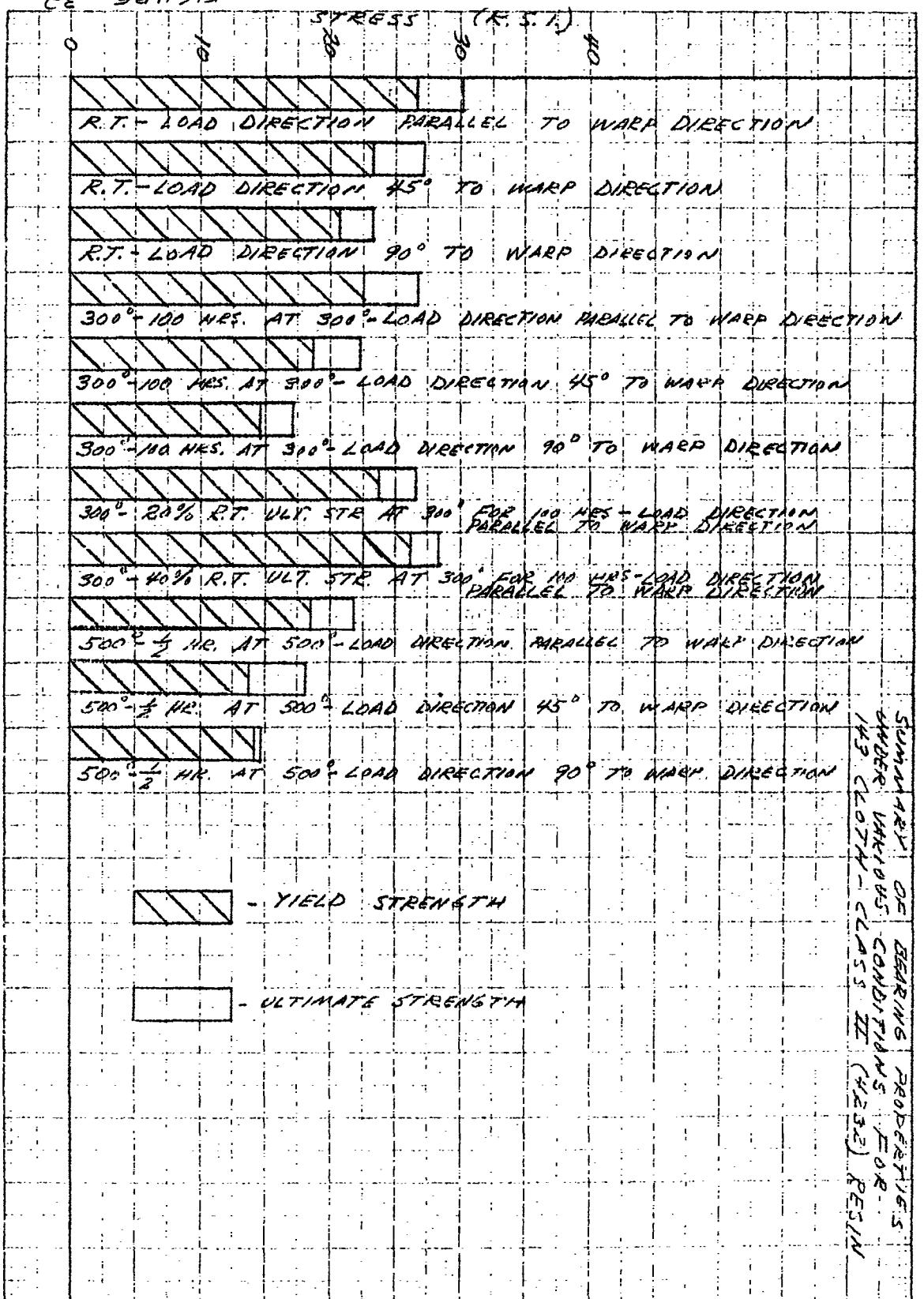

SUMMARY OF REARING PROPERTIES UNDER VARIOUS CONDITIONS FOR 181 CLOTH - CLASS IV (8.5) RESIN
ULTIMATE STR.
YIELD STR.
500°-½ HR AT 500°-LOAD DIRECTION 90° TO WARP DIRECTION
500°-½ HR AT 500°-LOAD DIRECTION 45° TO WARP DIRECTION
500°-½ HR AT 500°-LOAD DIRECTION PARALLEL TO WARP DIRECTION
300°-40% E.T. ULT. STR. AT 260° FOR 100 HRS - LOAD DIRECTION PARALLEL TO WARP DIRECTION
300°-20% R.T. ULT. STR. AT 260° FOR 100 HRS - LOAD DIRECTION PARALLEL TO WARP DIRECTION
300°-100 HRS AT 300°-LOAD DIRECTION 90° TO WARP DIRECTION
300°-100 HRS AT 300°-LOAD DIRECTION 45° TO WARP DIRECTION
300°-100 HRS AT 300°-LOAD DIRECTION PARALLEL TO WARP DIRECTION
300°-½ HR. AT 300°-LOAD DIRECTION 90° TO WARP DIRECTION
300°-½ HR AT 300°-LOAD DIRECTION 45° TO WARP DIRECTION
300°-½ HR AT 300°-LOAD DIRECTION PARALLEL TO WARP DIRECTION
R.T.-WET-LOAD DIRECTION 90° TO WARP DIRECTION
R.T.-WET-LOAD DIRECTION 45° TO WARP DIRECTION
R.T.-WET-LOAD DIRECTION PARALLEL TO WARP DIRECTION
R.T.-LOAD DIRECTION 90° TO WARP DIRECTION
R.T.-LOAD DIRECTION 45° TO WARP DIRECTION
R.T.-LOAD DIRECTION PARALLEL TO WARP DIRECTION
STRESS (K.S.I.)
0
10
20
30
40
50

FIGURE 31

FIGURE 34




SUMMARY OF BEARING PROPERTIES UNDER VARIOUS CONDITIONS FOR 181 CLOTH - CLASS III (HEAT) RESIN

ULTIMATE BEARING STRENGTH
VS. TEST TEMPERATURE AND
CONDITION FOR 143-CLOTH-
CLASS III (576) RESIN
YIELD STRESS OMITTED BECAUSE
FAILURE OCCURRED BEFORE BEARING
HOLE WAS DEFORMED 4% OF ITS
ORIGINAL DIAMETER (.0075 IN.)
500°-2 HR AT 500°-LOAD DIRECTION 90° TO WARP DIRECTION
500°-2 HR AT 500°-LOAD DIRECTION 45° TO WARP DIRECTION
500°-2 HR AT 500°-LOAD DIRECTION PARALLEL TO WARP DIRECTION
300°-10 HRS AT 300°-LOAD DIRECTION 90° TO WARP DIRECTION
300°-10 HRS AT 300°-LOAD DIRECTION 45° TO WARP DIRECTION
300°-100 HRS AT 300°-LOAD DIRECTION PARALLEL TO WARP DIRECTION
RT-LOAD DIRECTION 90° TO WARP DIRECTION
RT-LOAD DIRECTION 45° TO WARP DIRECTION
RT-LOAD DIRECTION PARALLEL TO WARP DIRECTION
STRESS (KSI)
30
20
10
0

FIGURE 33

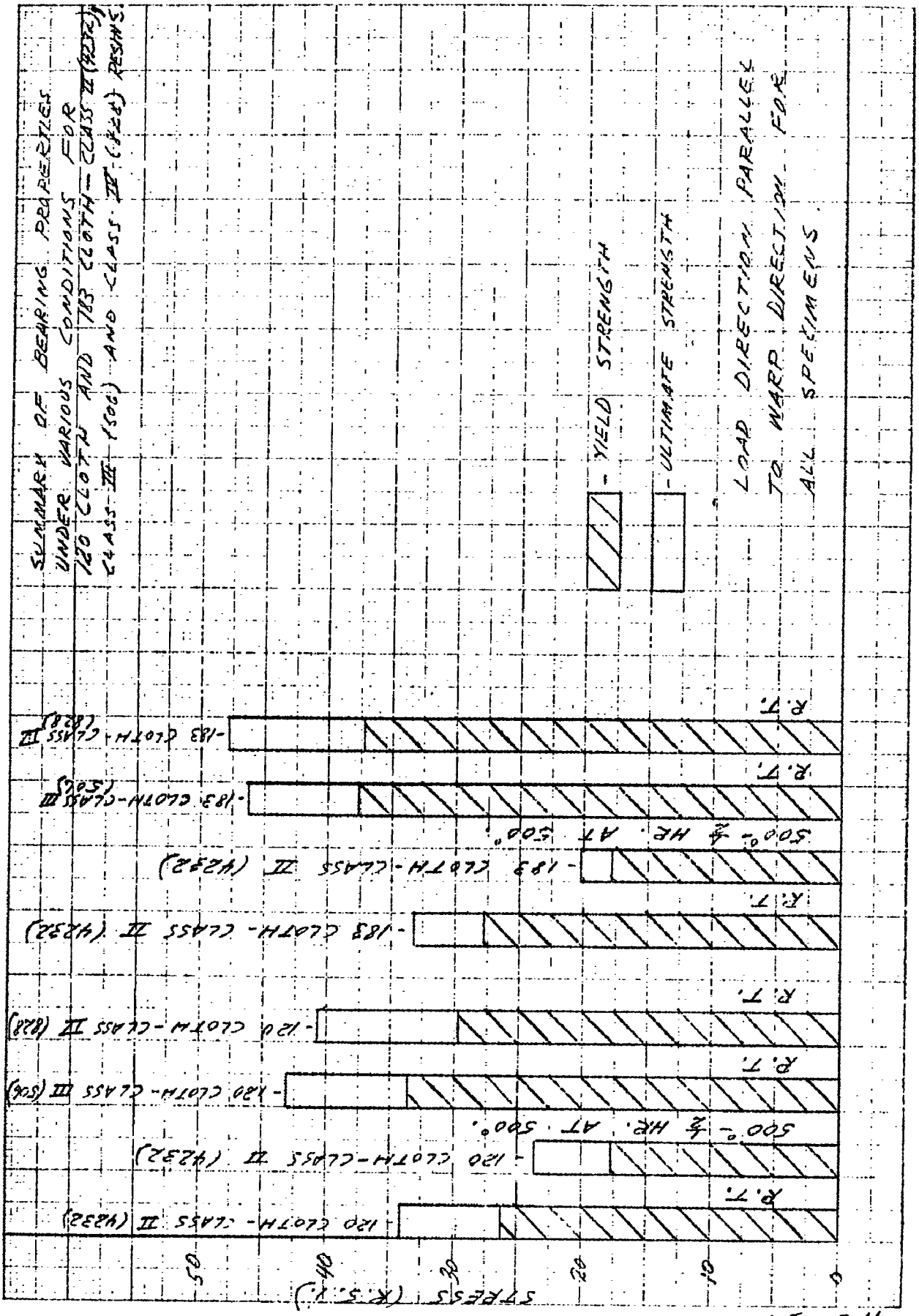

SUMMARY OF BEARING PROPERTIES
UNDER VARIOUS CONDITIONS FOR
120 CLOTH AND 183 CLOTH - CLASS II (4232)
CLASS III (506) AND CLASS III (828) RESINS
- YIELD STRENGTH
- ULTIMATE STRENGTH
LOAD DIRECTION PARALLEL
TO WARP DIRECTION FOR
ALL SPECIMENS
R.T.
-183 CLOTH - CLASS III (828)
-183 CLOTH - CLASS III (506)
500° - ½ HR. AT 500°
-183 CLOTH - CLASS II (4232)
-120 CLOTH - CLASS II (828)
-120 CLOTH - CLASS III (506)
-120 CLOTH - CLASS II (4232)
-120 CLOTH - CLASS II (4232)
50
40
30
20
10
0
STRESS (K.S.I.)

FIGURE 34

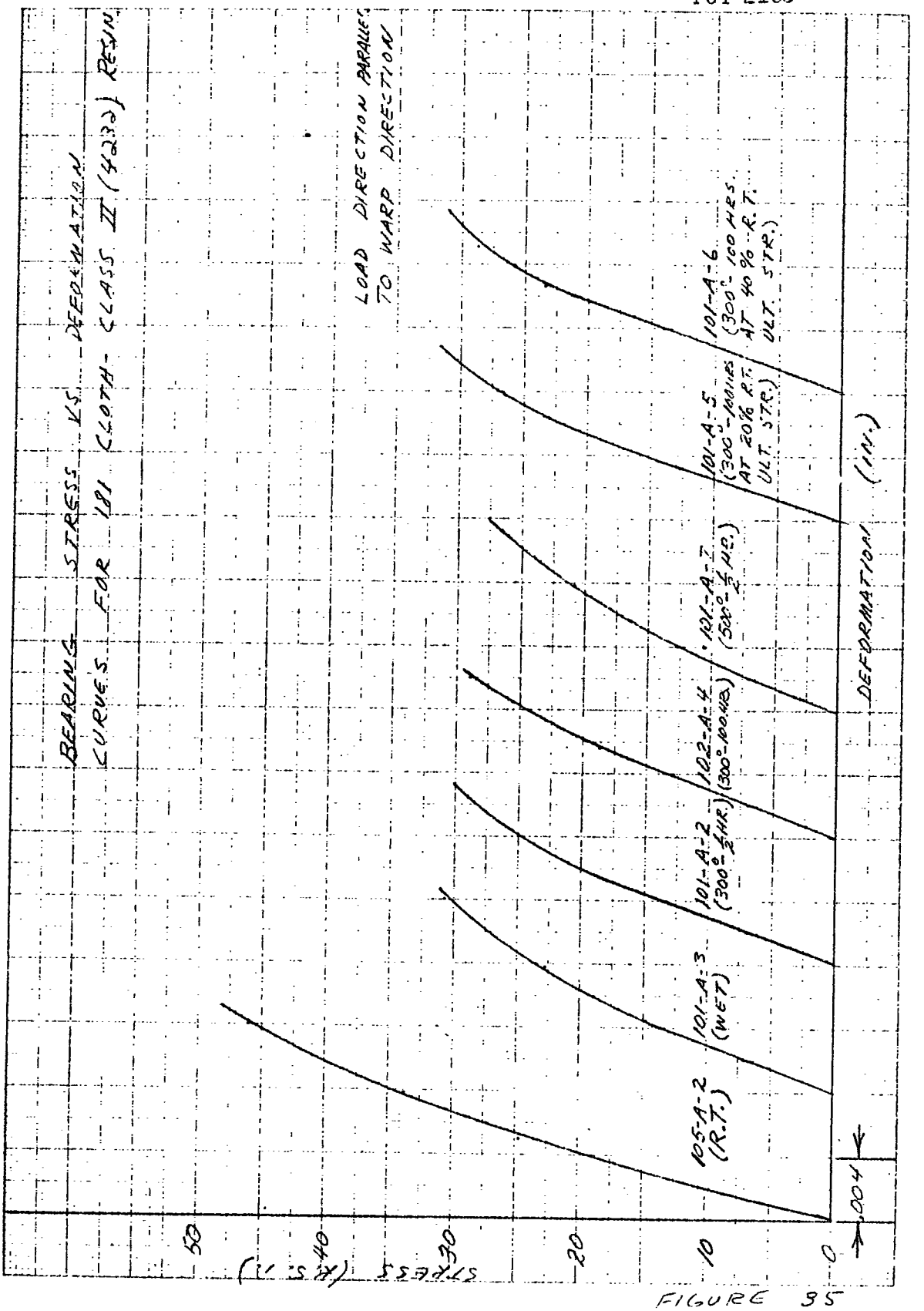

BEARING STRESS VS. DEFORMATION
CURVES FOR 181 CLOTH- CLASS III (4211) RESIN
LOAD DIRECTION PARALLEL TO WARP DIRECTION
STRESS (KSI)
50
40
30
20
10
0
.004
DEFORMATION (IN.)
105-A-2 (R.T.)
101-A-3 (WET)
101-A-2 (300°F-2HR.)
102-A-4 (300°-100HR.)
101-A-7 (320°F-2HR.)
101-A-5 (300°-100 HRS. AT 20% R.T. ULT. STR.)
101-A-6 (300°-100 HRS. AT 40% R.T. ULT. STR.)

FIGURE 35

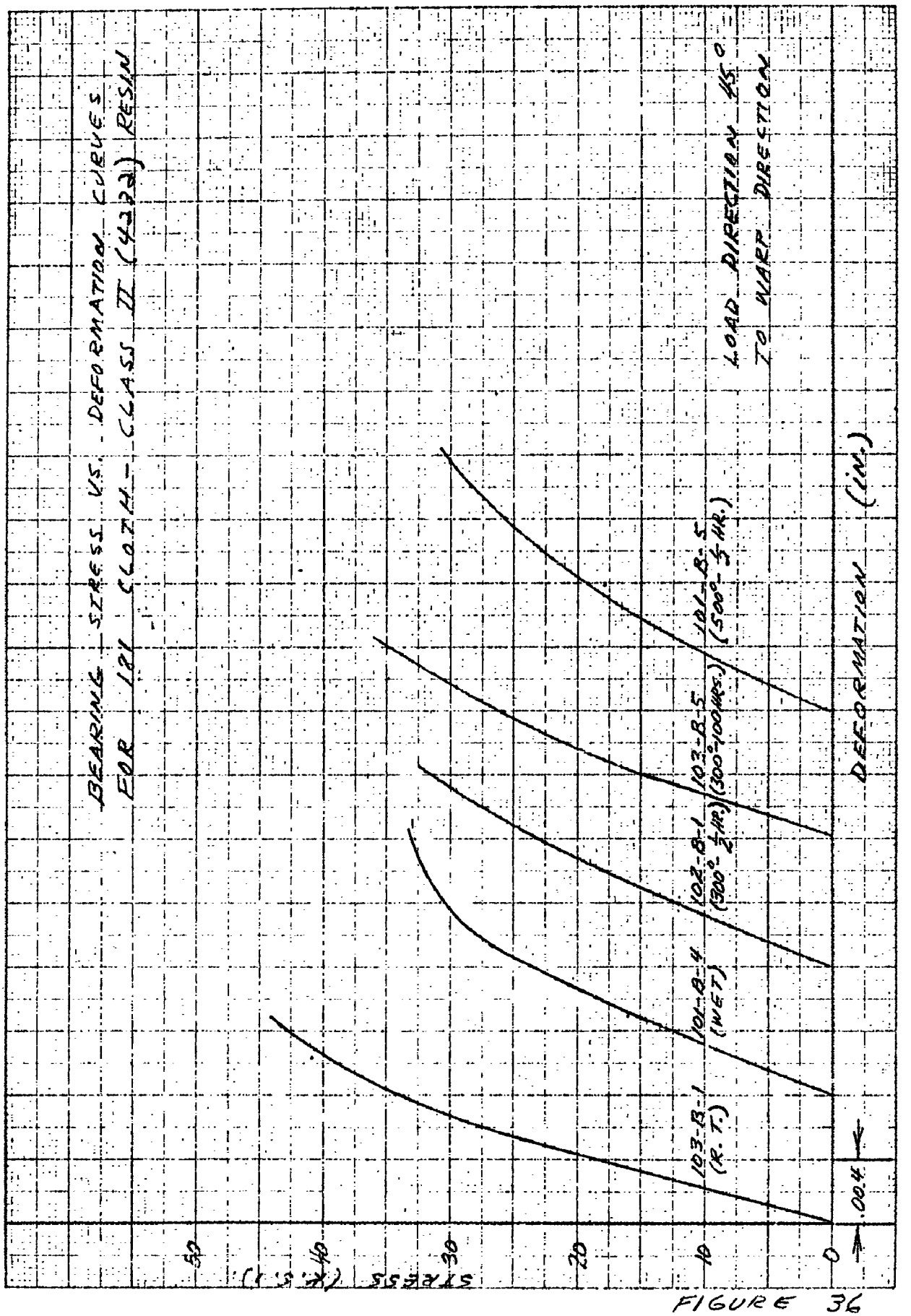

BEARING STRESS VS. DEFORMATION CURVES
FOR 181 CLOTH - CLASS II (4232) RESIN
STRESS (psi)
50
40
30
20
10
0
.004
DEFORMATION (in.)
LOAD DIRECTION 45°
TO WARP DIRECTION
103-B-1 (R.T.)
101-A-4 (WET)
102-B-1 (300° - ½ HR.)
103-B-1 (300° - 100 HRS.)
101-B-5 (500° - ½ HR.)

FIGURE 36

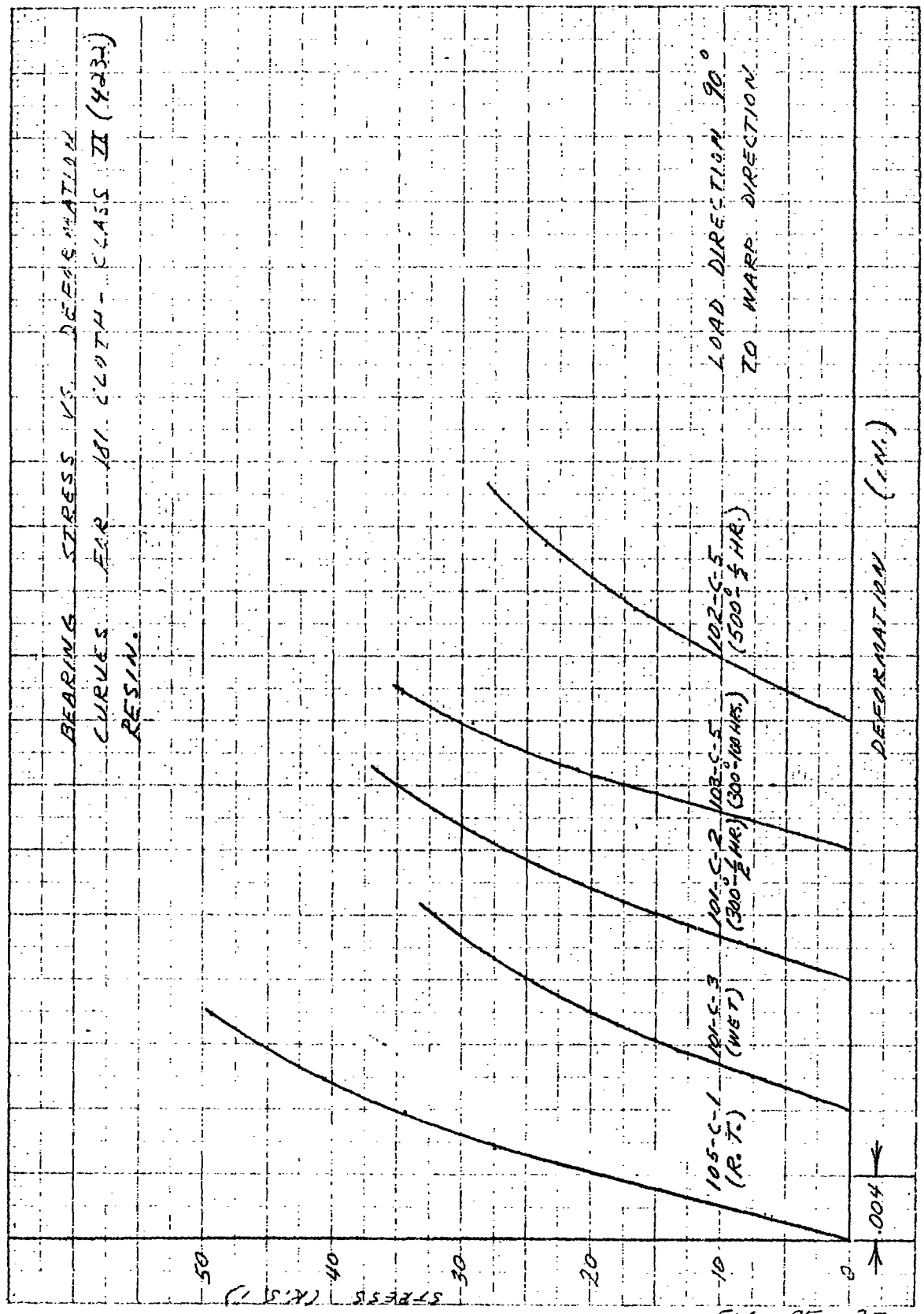

BEARING STRESS VS. DEFORMATION
CURVES FOR 181 CLOTH - CLASS II (434)
RESIN.
STRESS (KSI)
50
40
30
20
10
0
.004
DEFORMATION (IN.)
105-C-1 (R.T.)
101-C-3 (WET)
101-C-2 (300°-2 HR.)
103-C-5 (300°-100 HR.)
102-C-5 (500°-5 HR.)
LOAD DIRECTION 90°
TO WARP DIRECTION

FIGURE 37

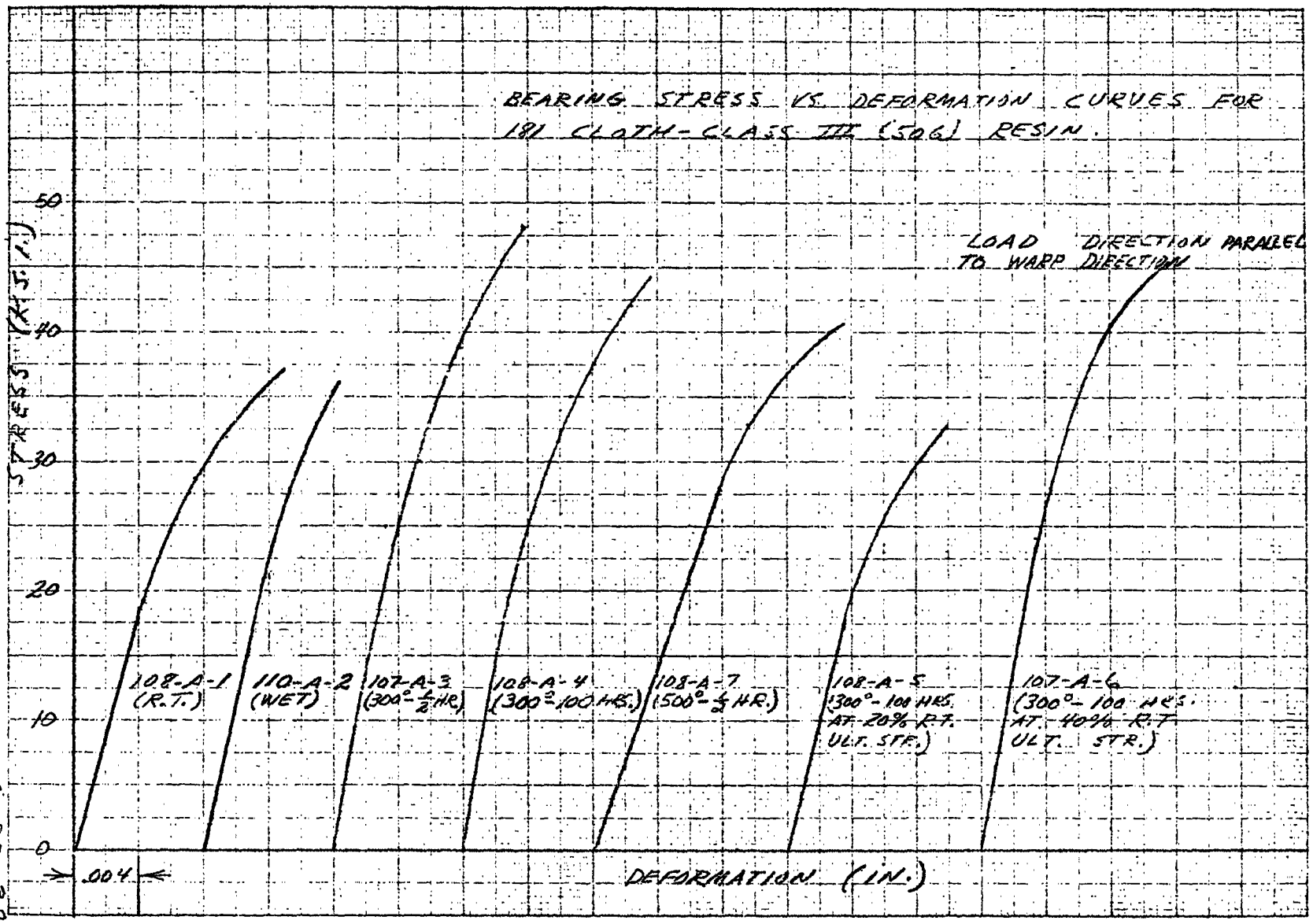

BEARING STRESS VS. DEFORMATION CURVES FOR
181 CLOTH - CLASS III (506) RESIN.
LOAD DIRECTION PARALLEL TO WARP DIRECTION
STRESS (KSI)
50
40
30
20
10
0
.004
DEFORMATION (IN.)
108-A-1 (R.T.)
110-A-2 (WET)
107-A-3 (300° - ½ HR.)
108-A-4 (300° - 100 HRS.)
108-A-7 (500° - ½ HR.)
108-A-5 (300° - 100 HRS. AT 20% R.T. ULT. STR.)
107-A-6 (300° - 100 HRS. AT 40% R.T. ULT. STR.)

FIGURE 38

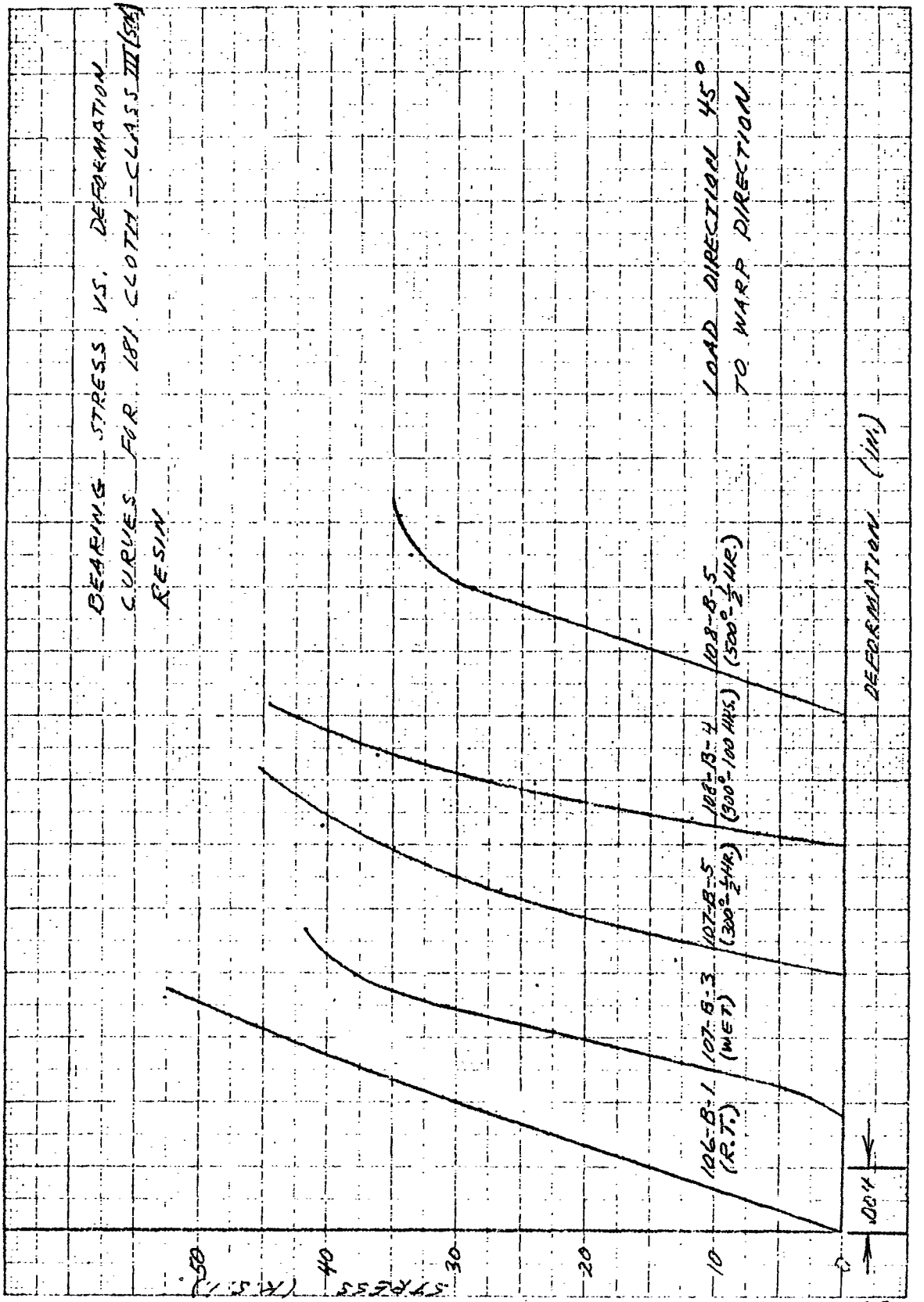

BEARING STRESS VS. DEFORMATION
CURVES FOR 181 CLOTH - CLASS III (S2)
RESIN
106-B-1 (R.T.)
107-B-3 (WET)
107-B-5 (300°-½ HR.)
106-B-4 (300°-100 HRS.)
108-B-5 (300°-½ HR.)
LOAD DIRECTION 45°
TO WARP DIRECTION
STRESS (KSI)
50
40
30
20
10
.004
DEFORMATION (IN.)

FIGURE 39

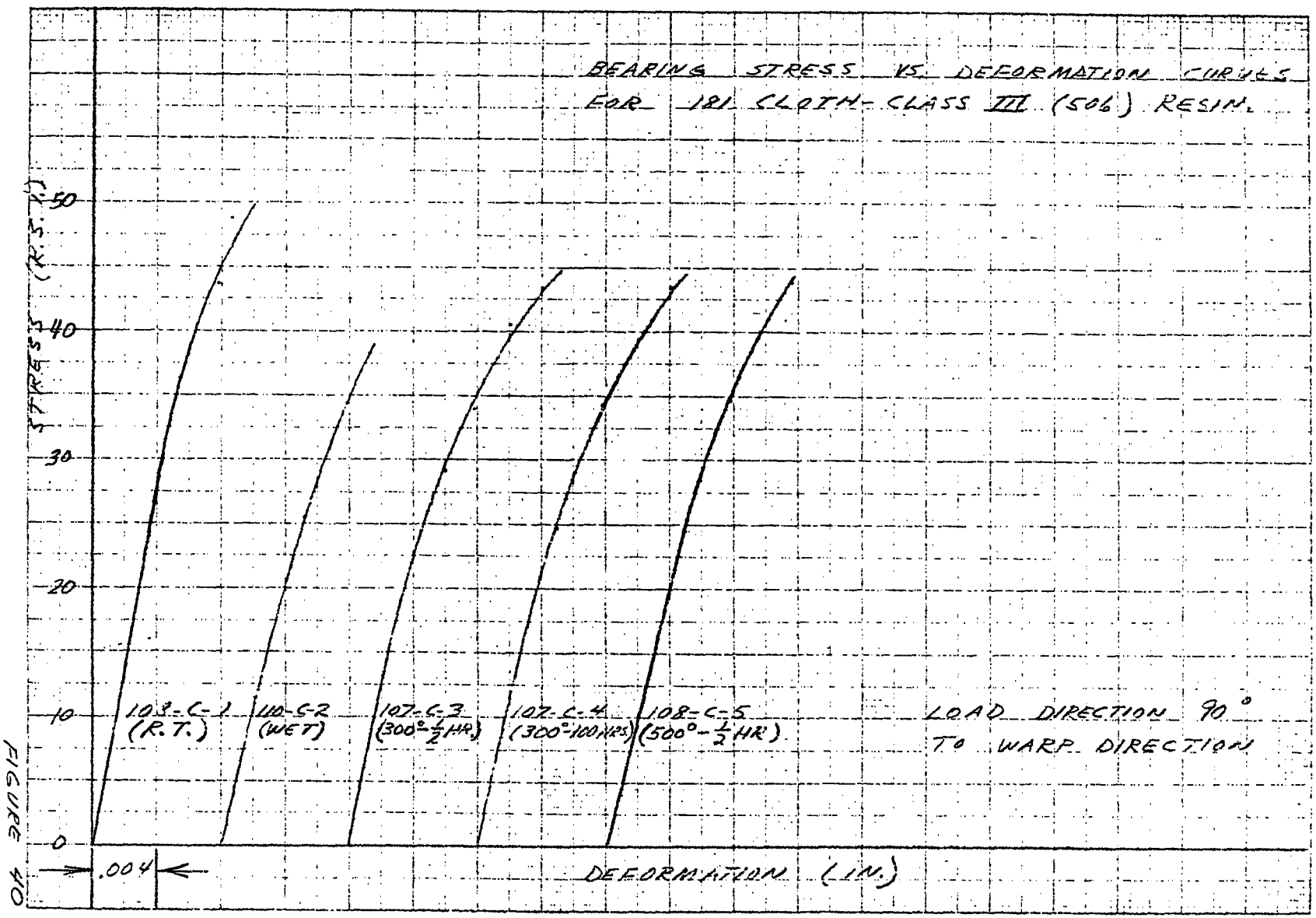

BEARING STRESS VS. DEFORMATION CURVES
FOR 181 CLOTH - CLASS III (506) RESIN.
STRESS (K.S.I.)
50
40
30
20
10
0
.004
DEFORMATION (IN.)
108-C-1 (R.T.)
110-C-2 (WET)
107-C-3 (300°-½ HR.)
102-C-4 (300°-100 HRS.)
108-C-5 (500°-½ HR.)
LOAD DIRECTION 90° TO WARP DIRECTION

FIGURE 40

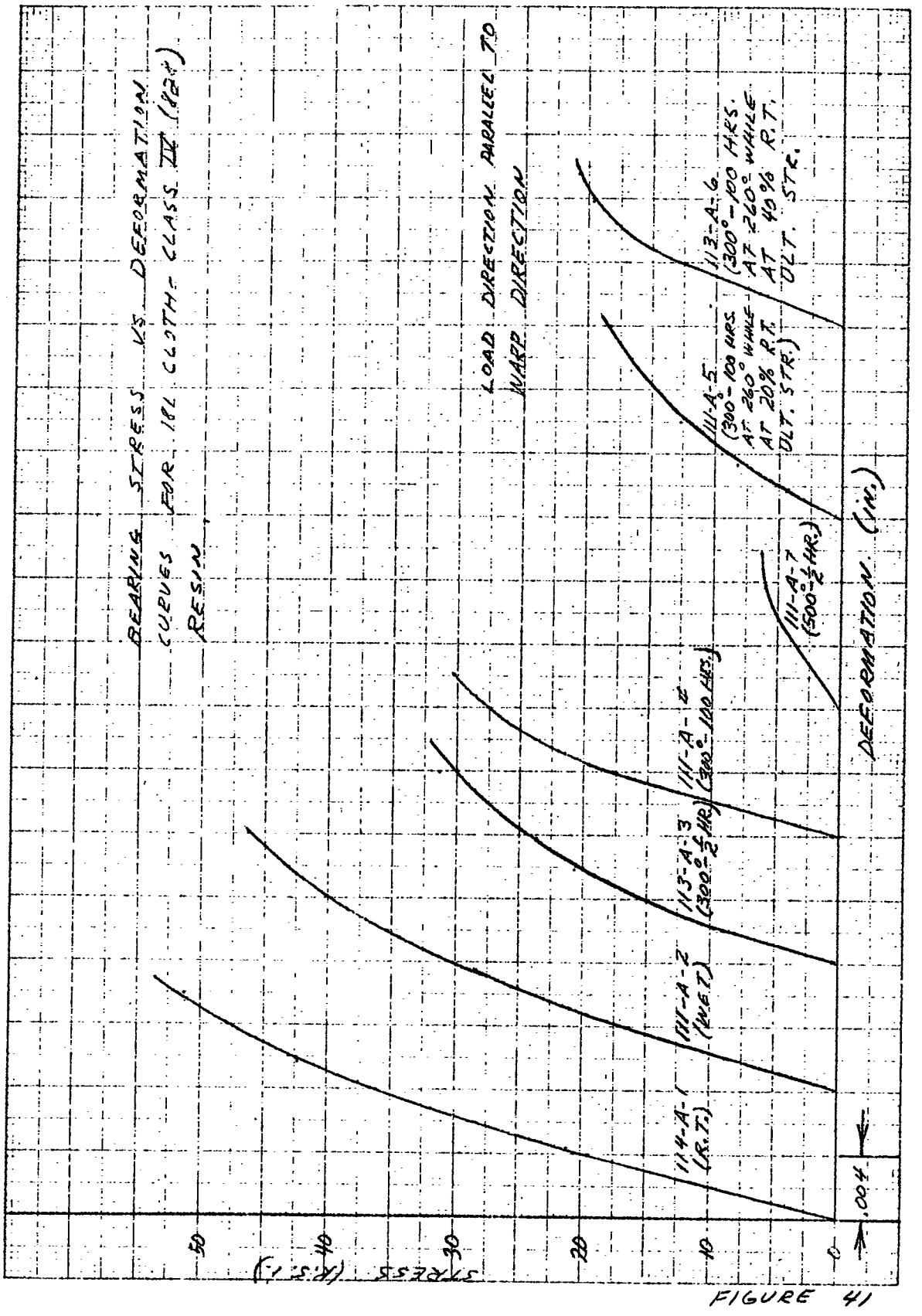

BEARING STRESS VS DEFORMATION
CURVES FOR 181 CLOTH - CLASS III (182°)
RESIN
LOAD DIRECTION PARALLEL TO WARP DIRECTION
STRESS (KSI)
0
10
20
30
40
50
.004
DEFORMATION (in.)
114-A-1 (R.T.)
111-A-2 (WET)
113-A-3 (300° - ½ HR.)
111-A-4 (300° - 100 HRS.)
111-A-5 (300 - 100 HRS. AT 260° WHILE AT 20% R.T. DLT. STR.)
111-A-7 (300 - ½ HR.)
113-A-6 (300° - 100 HRS. AT 260° WHILE AT 40% R.T. DLT. STR.

FIGURE 41

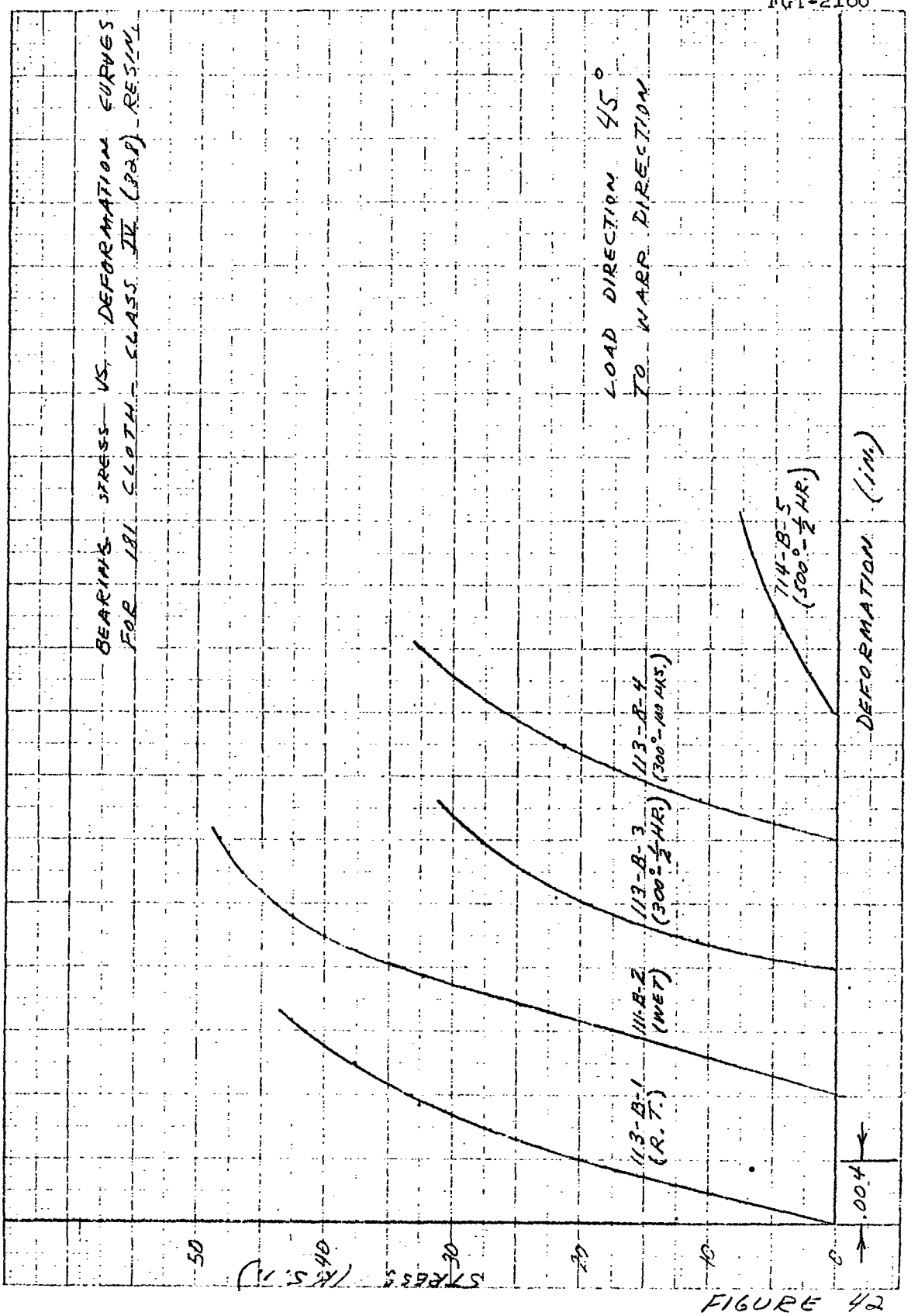

BEARING STRESS VS. DEFORMATION CURVES
FOR 181 CLOTH - GLASS III (302) RESIN
LOAD DIRECTION 45°
TO WARP DIRECTION
STRESS (K.S.I.)
DEFORMATION (in.)
0
10
20
30
40
50
.004
113-B-1 (R.T.)
111-B-2 (WET)
113-B-3 (300°-½ HR.)
113-B-4 (300°-100 HRS.)
114-B-5 (500°-½ HR.)

FIGURE 42

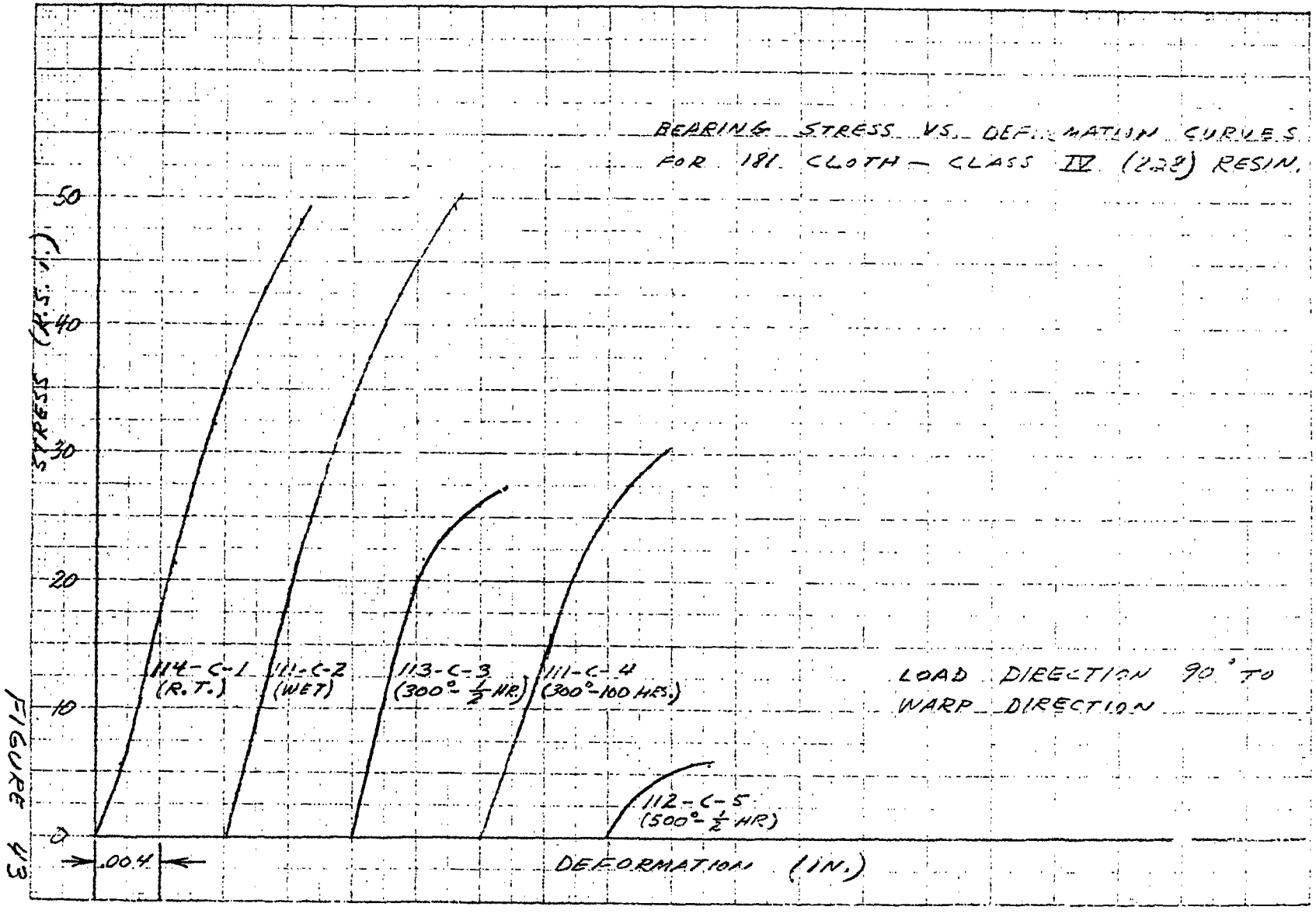

BEARING STRESS VS. DEFORMATION CURVES
FOR 181 CLOTH — CLASS IV (220) RESIN.
STRESS (K.S.I.)
50
40
30
20
10
0
.004
DEFORMATION (IN.)
114-C-1 (R.T.)
111-C-2 (WET)
113-C-3 (300° - ½ HR.)
111-C-4 (300° - 100 HRS.)
112-C-5 (500° - ½ HR.)
LOAD DIRECTION 90° TO WARP DIRECTION

FIGURE 43

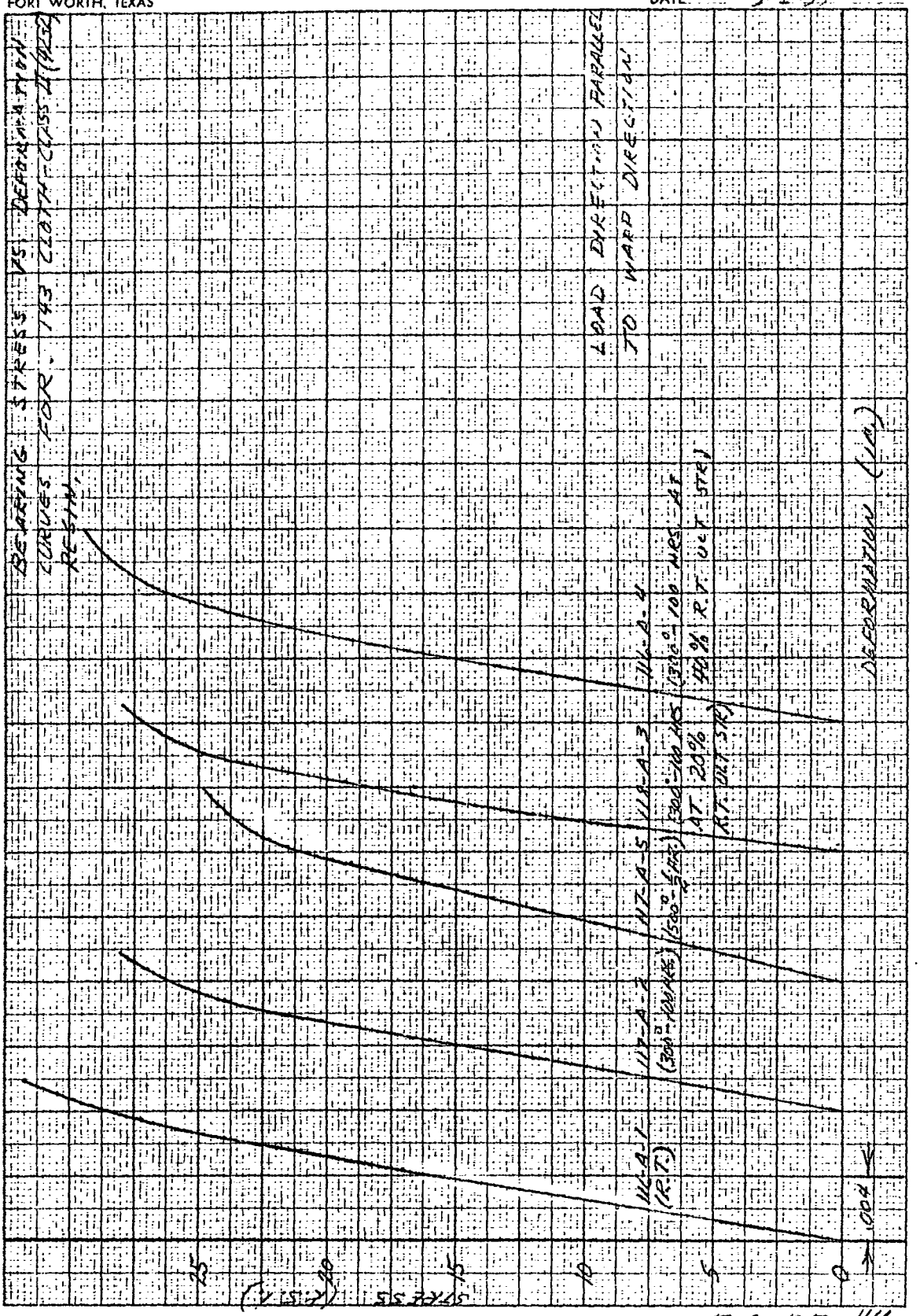

BEARING STRESS VS. DEFORMATION
CURVES FOR 143 CLOTH-CLASS II (4252)
RESIN,
LOAD DIRECTION PARALLEL
TO WARP DIRECTION
116-A-1 (R.T.)
117-A-2 (300°-100 HRS)
117-A-5 (500°-½ HR)
118-A-3 (300°-100 HRS AT 20% R.T. ULT. STR)
116-A-4 (300°-100 HRS AT 40% R.T. ULT. STR)
DEFORMATION (IN.)
.004
0
5
10
15
20
25
STRESS (K.S.I.)

FIGURE 44

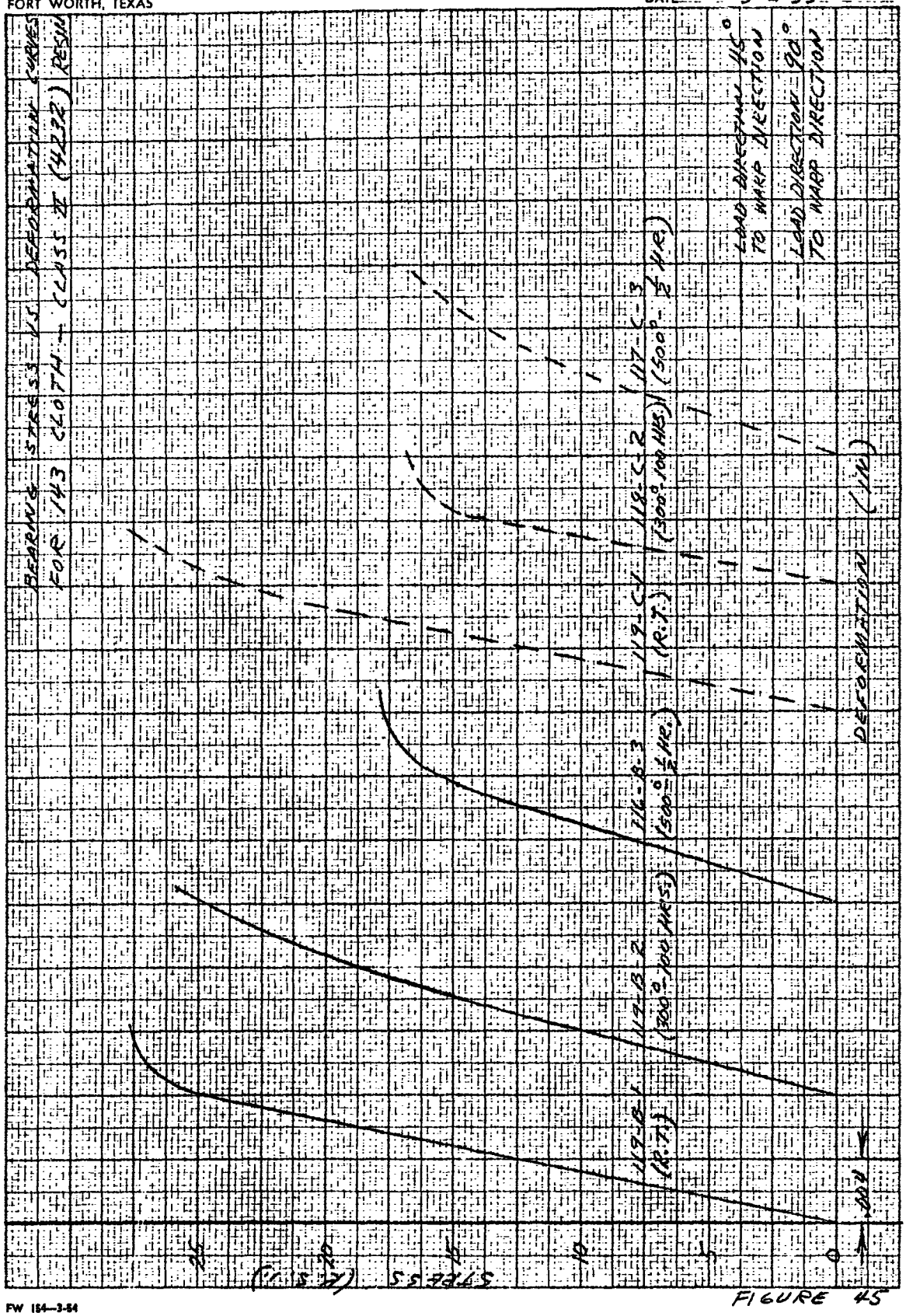

BEARING STRESS VS DEFORMATION CURVES
FOR 143 CLOTH - CLASS II (4232) RESIN
LOAD DIRECTION 45° TO WARP DIRECTION
LOAD DIRECTION 90° TO WARP DIRECTION
119-B-1 (R.T.)
119-B-2 (300°-100 HRS.)
116-B-3 (500°-½ HR.)
119-C-1 (R.T.)
118-C-2 (300°-100 HRS.)
117-C-3 (500°-½ HR.)
DEFORMATION (IN)
.004
STRESS (K.S.I.)
0
5
10
15
20
25

FIGURE 45

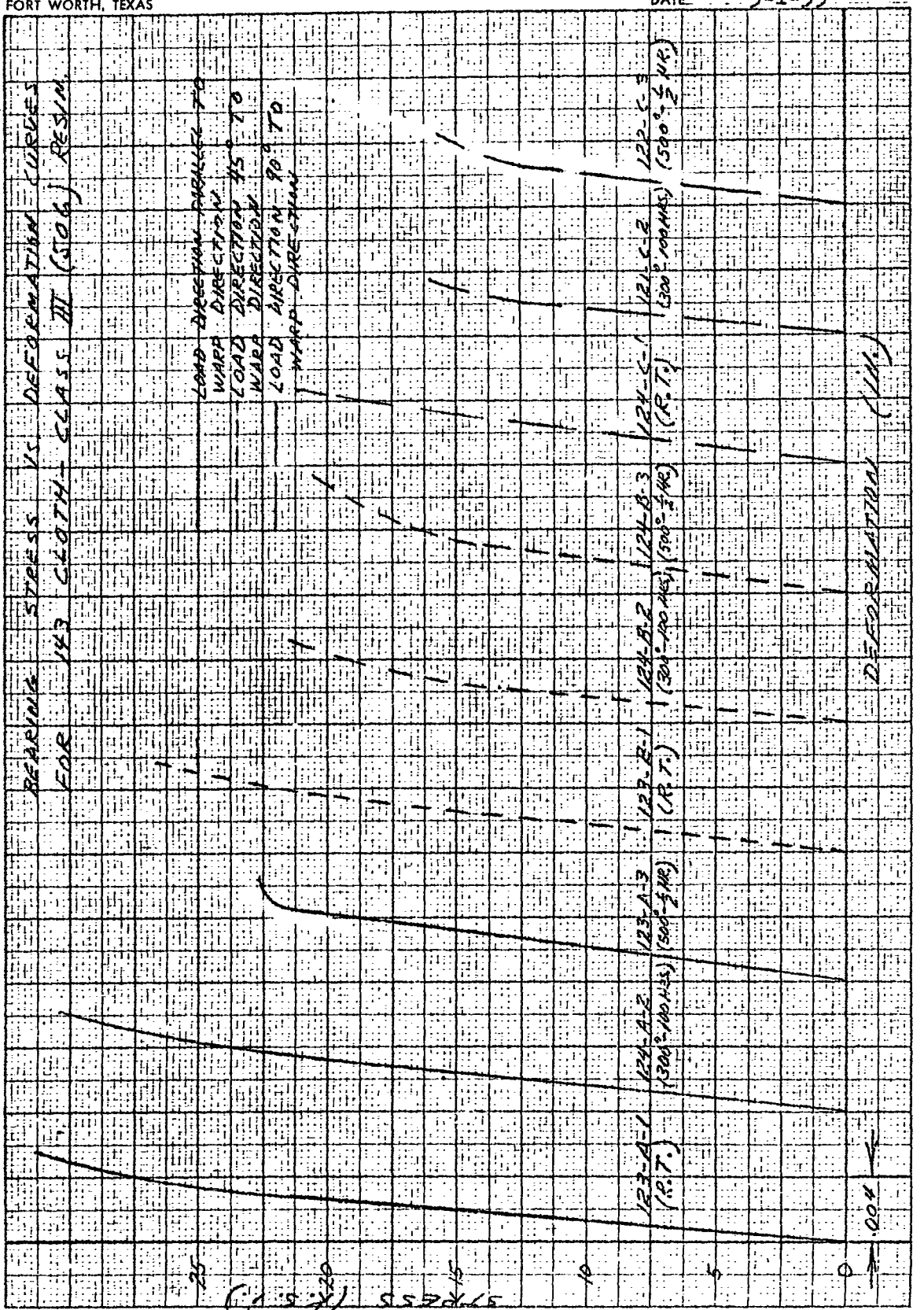

BEARING STRESS VS DEFORMATION CURVES
FOR 143 CLOTH - CLASS III (STOKES) RESIN
LOAD DIRECTION PARALLEL TO WARP DIRECTION
LOAD DIRECTION 45° TO WARP DIRECTION
LOAD DIRECTION 90° TO WARP DIRECTION
123-A-1 (R.T.)
124-A-2 (300°/100 HRS)
123-A-3 (300°/½ HR)
123-B-1 (R.T.)
124-B-2 (300°/100 HRS)
124-B-3 (300°/½ HR)
124-C-1 (R.T.)
124-C-2 (300°/100 HRS)
122-C-3 (300°/½ HR)
BEARING STRESS (KSI)
25
20
15
10
5
0
.004
DEFORMATION (IN.)

FIGURE 46

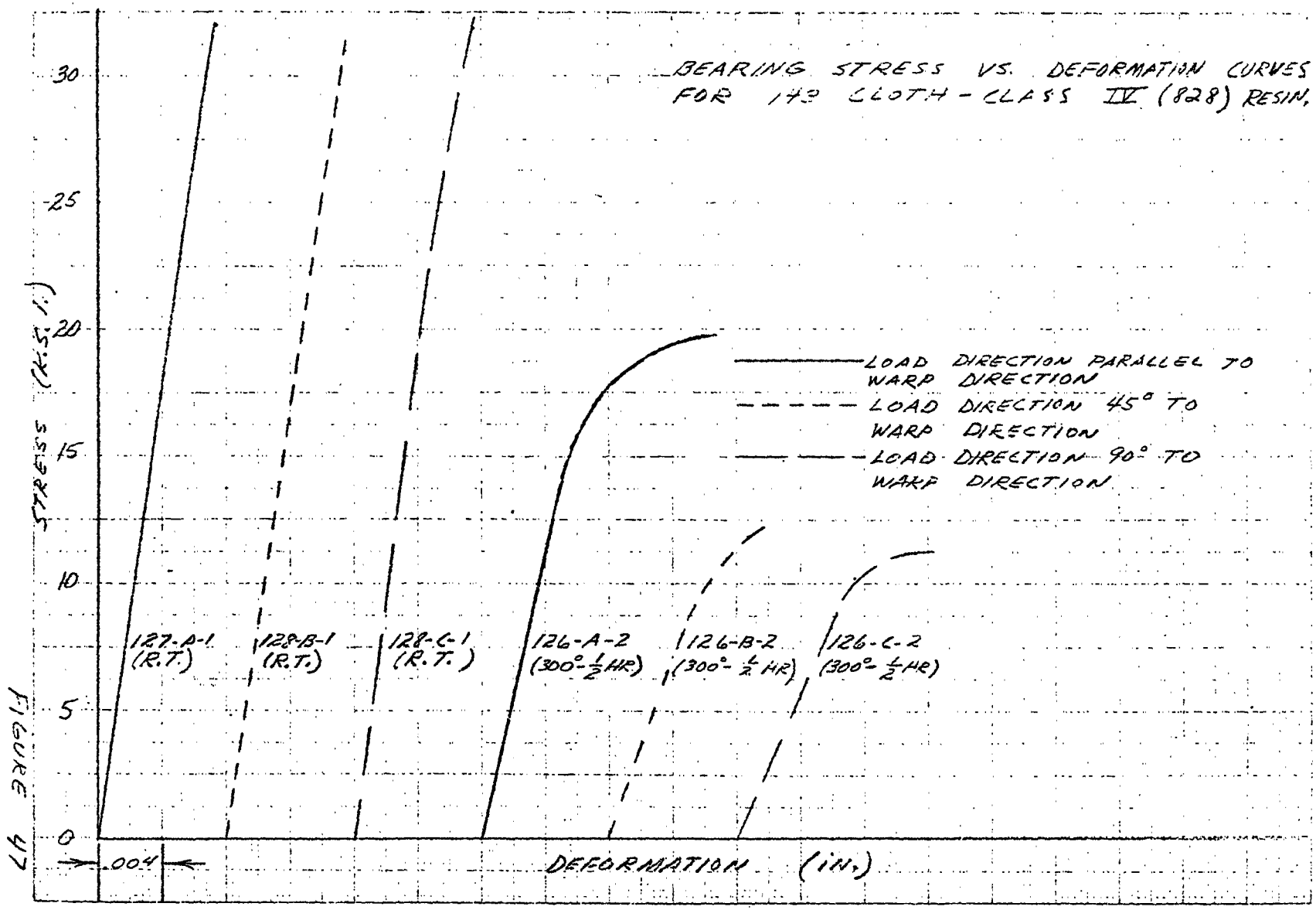

BEARING STRESS VS. DEFORMATION CURVES
FOR 143 CLOTH - CLASS IV (828) RESIN.
STRESS (K.S.I.)
30
25
20
15
10
5
0
.004
DEFORMATION (IN.)
LOAD DIRECTION PARALLEL TO WARP DIRECTION
LOAD DIRECTION 45° TO WARP DIRECTION
LOAD DIRECTION 90° TO WARP DIRECTION
127-A-1 (R.T.)
128-B-1 (R.T.)
128-C-1 (R.T.)
126-A-2 (300° - ½ HR)
126-B-2 (300° - ½ HR)
126-C-2 (300° - ½ HR)

FIGURE 47

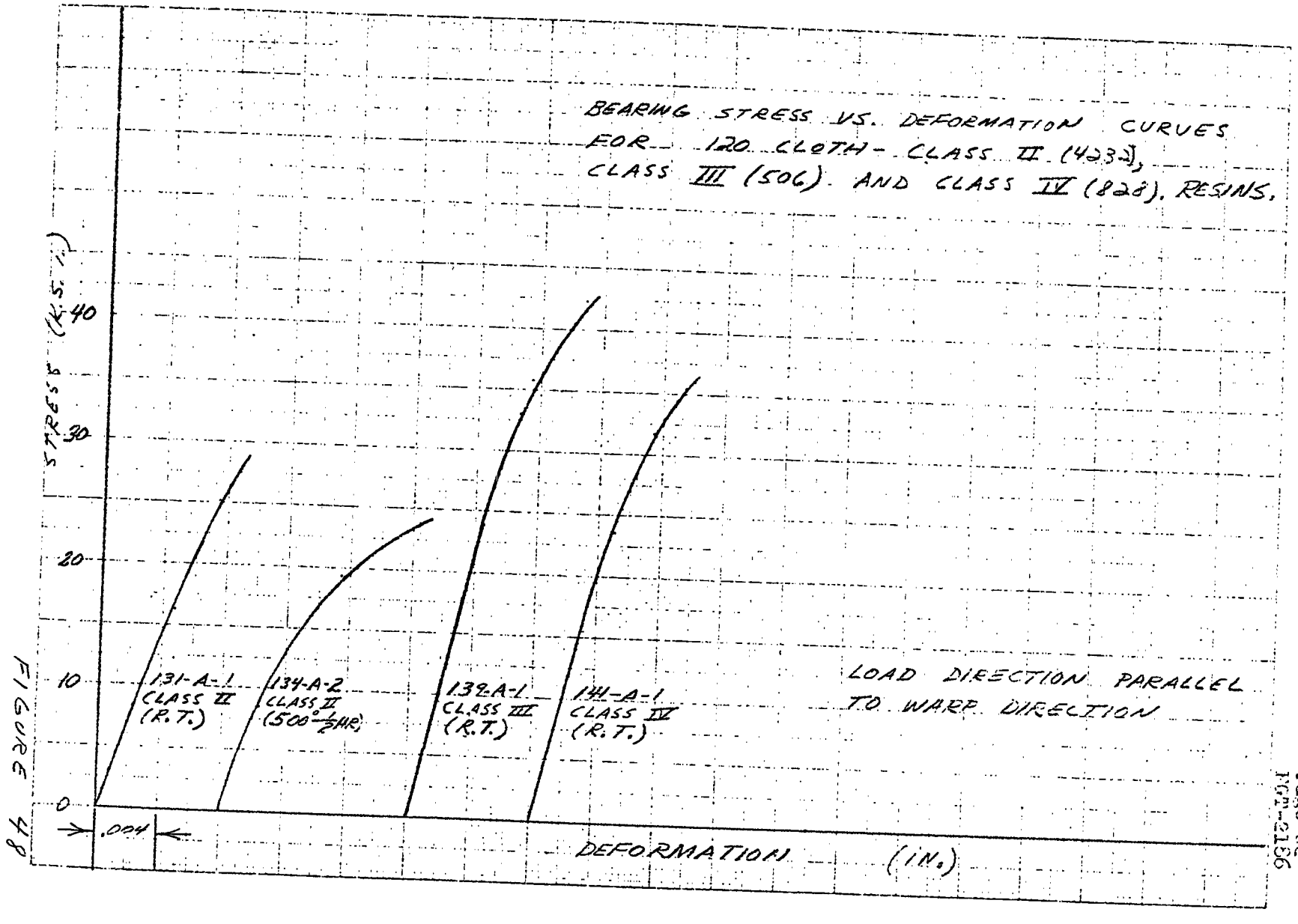

BEARING STRESS VS. DEFORMATION CURVES FOR 120 CLOTH - CLASS II (423), CLASS III (506) AND CLASS IV (828), RESINS.
STRESS (K.S.I.)
40
30
20
10
0
131-A-1 CLASS II (R.T.)
134-A-2 CLASS II (500 - 1/2 HR)
139-A-1 CLASS III (R.T.)
144-A-1 CLASS IV (R.T.)
LOAD DIRECTION PARALLEL TO WARP DIRECTION
.004
DEFORMATION (IN.)

FIGURE 48

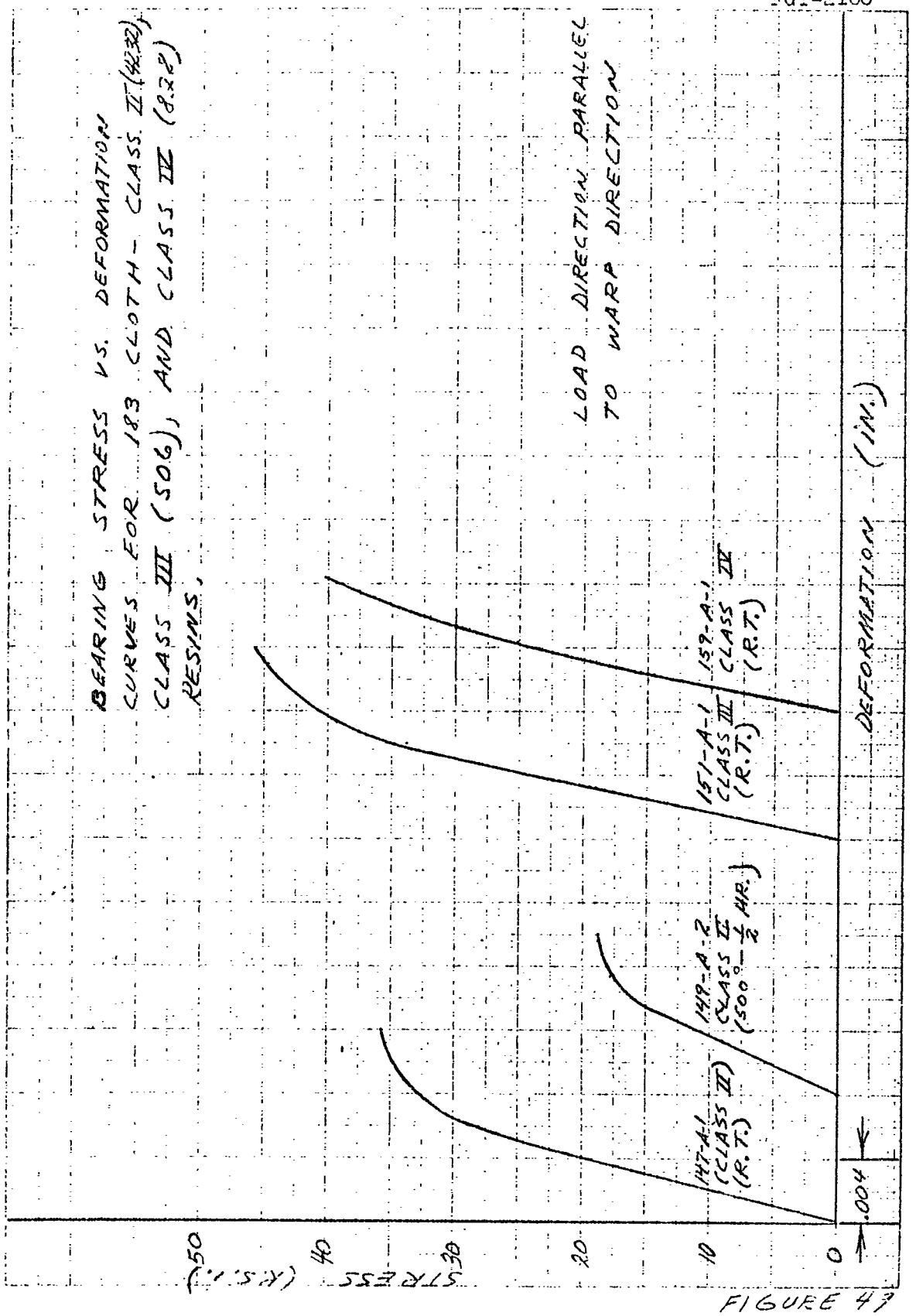
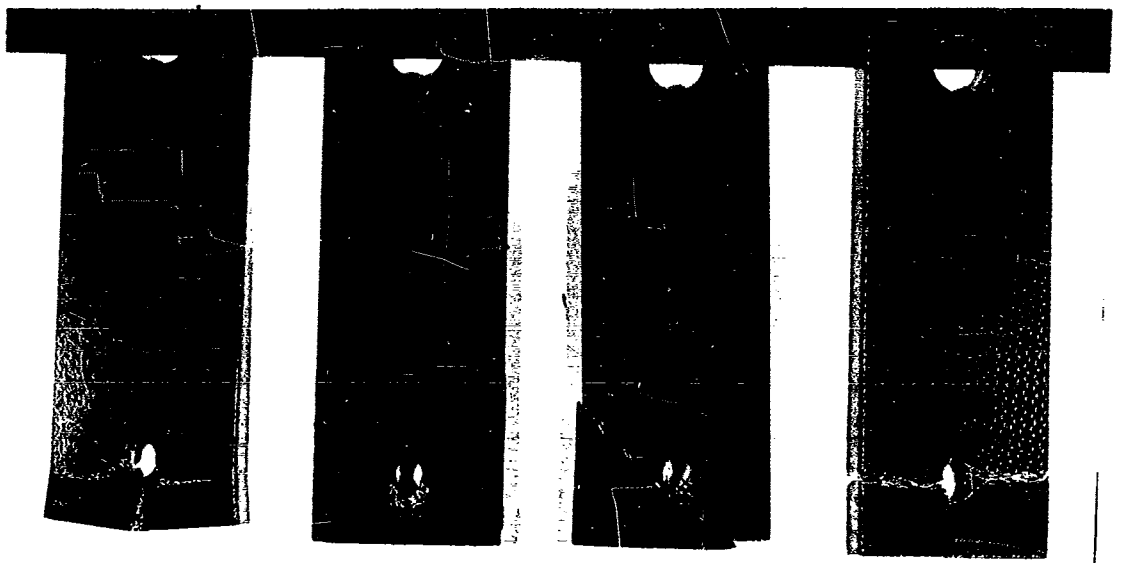

BEARING STRESS VS. DEFORMATION
CURVES FOR 183 CLOTH - CLASS II (4432),
CLASS III (506), AND CLASS III (828)
RESINS,
LOAD DIRECTION PARALLEL
TO WARP DIRECTION
147-A-1
(CLASS III)
(R.T.)
149-A-2
(CLASS III
(500°-½ HR.)
151-A-1
CLASS III
(R.T.)
159-A-1
CLASS III
(R.T.)
STRESS (K.S.I.)
50
40
30
20
10
0
.004
DEFORMATION (IN.)

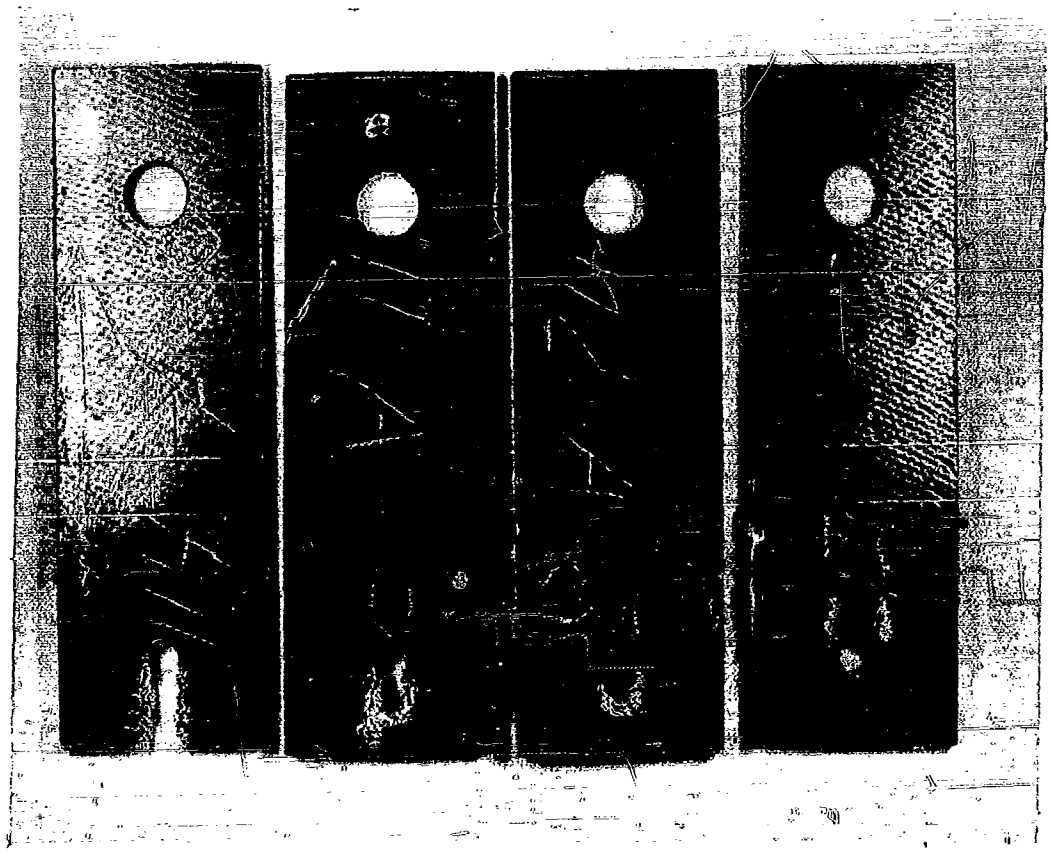
FIGURE 43



Mag. Appr. 1X

From Bearing Tests.

Figure 50



Mag. 1X

Bearing Failures From Sustained Load Tests.

Material - 181 Cloth - Class IV (32%).

Temperature while loaded - 200 F - Load time 100 hrs. or less.

Loads from left to right - 21,020 psi, 21,020 psi, 21,020 psi, and 10,510 psi.

Figure 51

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE I HISTORY AND PHYSICAL PROPERTIES OF FIBERGLASS TEST PANELS (2)

| PANEL NO. | TYPE CLOTH | TYPE RESIN | DATE REC'D FROM SHOP | BARCOL HARDNESS | RESIN CONTENT (%) | NO. OF PLIES | THICKNESS MAX. (IN.) | THICKNESS MIN (IN.) | TYPE CURE | CURE CYCLE | POST CURE | DIELECTRIC CONSTANT (K) | DISSIPATION FACTOR (D) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 100 | 181 | 4232 | AUG-'57 | 66 | 43.6 | | .1398 | .1270 | VACUUM | | | | | (1) |
| 101 | | | MAY '57 | 69 | 40.0 | 12 | .1285 | .1153 | | 200°-2 HRS.<br>250°-1 HR.<br>300°-½ HR. | 200°-½ HR.<br>300°-½ HR.<br>350°-1 HR.<br>400°-1 HR.<br>450°-1 HR<br>500°-2 HR. | 5.4 | .0082 | |
| 102 | | | JULY '57 | 71 | 37.9 | 12 | .1283 | .1109 | | 200°-2 HRS.<br>250°-1 HR.<br>300°-½ HR. | 200°-½ HR.<br>300°-½ HR.<br>350°-1 HR.<br>400°-1 HR.<br>450°-1 HR.<br>500°-2 HR. | 5.1 | .0082 | |
| 103 | | | JULY '57 | 67 | 33.4 | 12 | .1210 | .1040 | | 200°-2 HRS.<br>250°-1 HR.<br>300°-½ HR. | 200°-½ HR<br>300°-½ HR<br>350°-1 HR.<br>400°-1 HR.<br>450°-1 HR.<br>500°-3 HRS. | 5.1 | .0086 | |
| 104 | | | AUG '57 | 71 | 38.5 | 13 | .1375 | .1115 | | 200°-2 HRS.<br>250°-1 HR.<br>300°-½ HR. | 200°-½ HR<br>300°-½ HR<br>350°-1 HR.<br>400°-1 HR.<br>450°-1 HR<br>500°-2 HRS. | | | |
| 105 | | | AUG '57 | 71 | 39.3 | 13 | .1394 | .1290 | | 200°-2 HRS.<br>250°-1 HR.<br>300°-½ HR. | 200°-½ HR.<br>300°-½ HR.<br>350°-1 HR.<br>400°-1 HR.<br>450°-1 HR.<br>500°-2 HRS. | | | |

(1) NO HISTORY SHEET ACCOMPANIED THIS PANEL

(2) DIELECTRIC CONSTANT AND DISSIPATION FACTOR OBTAINED WITH DELSEN CORP. D-K ANALYZER - 10 KILOCYCLES PER SECOND.

(3) ONLY THESE PANELS FABRICATED BY CHEMISTRY SECTION - ENGINEERING TEST LAB

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE I (CONTD) HISTORY AND PHYSICAL PROPERTIES OF FIBERGLASS TEST PANELS

| PANEL NO. | TYPE CLOTH | TYPE RESIN | DATE REC'D FROM SHOP | BARCOL HARDNESS | RESIN CONTENT (%) | NO. OF PLIES | THICKNESS MAX. (IN.) | THICKNESS MIN (IN.) | TYPE CURE | CURE CYCLE | POST CURE | DIELECTRIC CONSTANT (K) (2) | DISSIPATION FACTOR (D) (2) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 106 | 181 | 506 | OCT-'57 | 61 | 28.7 | 13 | .1110 | .1005 | PRESS | 350°-2HRS. | 350°-1½HRS.<br>400°-½HR<br>450°-½HR | 5.2 | .0100 | (3) |
| 107 | | | MARCH '57 | 73 | 30.1 | 15 | .1520 | .1110 | | 250°-¾HR.<br>310°-¼HR. | 300°-½HR.<br>350°-2HRS. | 5.2 | .0125 | |
| 108 | | | NOV '57 | 63 | 26.5 | | | | | | | | | |
| 110 | | | APRIL '57 | 68 | 27.3 | 15 | .1330 | .0950 | | 250°-35MIN.<br>310°- — | 300°-1HR.<br>350°-2HRS. | 5.0<br>5.0 | .0065<br>.0085 | (1) + (3) |
| 111 | 181 | 828 | JULY '57 | 70 | 42.2 | 12 | .1375 | .1187 | VACUUM | 150°-½HR.<br>200°-1HR.<br>250°-½HR. | 200°-½HR.<br>250°-½HR.<br>300°-1HR.<br>350°-2HRS.<br>400°-1 HR. | 5.6 | — | |
| 112 | | | SEPT '57 | 66 | 40.0 | 14 | .1355 | .1210 | | 200°-2HRS.<br>250°-1HR.<br>300°-½HR. | 200°-½HR.<br>300°-½HR.<br>350°-1 HR.<br>400°-1HR<br>450°-1HR.<br>500°-3HRS. | 5.3 | .012 | |
| 113 | | | OCT '57 | 69 | 32.5 | 12 | .1290 | .1100 | | 150°-½HR.<br>200°-1HR.<br>250°-½HR. | 200°-½HR.<br>250°-½HR.<br>300°-1 HR.<br>350°-2HRS.<br>400°-1 HR. | 5.5 | .016 | |
| 114 | | | OCT '57 | 70 | 31.1 | 12 | .1329 | .1095 | | — | 200°-½HR.<br>250°-½HR.<br>300°-1 HR.<br>350°-2HRS.<br>350°-1HR<br>400°-1 HR. | 5.3 | .0180 | |

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE I (CONTD) HISTORY AND PHYSICAL PROPERTIES OF FIBERGLASS TEST PANELS

| PANEL NO. | TYPE CLOTH | TYPE RESIN | DATE LAY'D FROM SHOT | BARCOL HARDNESS | RESIN CONTENT % | NO. OF PLIES | THICKNESS MAX. (IN.) | THICKNESS MIN. (IN.) | TYPE CURE | CURE CYCLE | POST CURE | DIELECTRIC CONSTANT (K) | DISSIPATION FACTOR (D) | (2) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 116 | 143 | 4232 | MAY '57 | 70 | 39.2 | 12 | .1280 | .1115 | VACUUM | 200°-2 HRS.<br>250°-1 HR.<br>300°-½ HR. | 200°-½ HR.<br>300°-½ HR.<br>350°-1 HR.<br>400°-1 HR.<br>450°-1 HR<br>500°-2 HRS. | 5.5 | .0118 | |
| 117 | | | MAY '57 | 68 | 31.4 | — | .1220 | .1020 | | 200°-2 HRS.<br>250°-1 HR.<br>300°-½ HR. | 200°-½ HR.<br>250°-½ HR.<br>300°-1 HR<br>350°-2 HRS<br>400°-1 HR<br>450°-1 HR<br>500°-3 HRS | 5.3 | .0210 | |
| 118 | | | SEPT '57 | 68 | 31.1 | | .1368 | .1126 | | | | 5.1 | .0100 | (1) |
| 119 | | | MARCH '58 | 69 | 40.4 | | .1190 | .1016 | | | | 5.1 | .009 | (1) |
| 121 | 143 | 506 | DEC '57 | 68 | 30.1 | 12 | .1010 | .0885 | PRESS | 275°-1½ HR. | 300°-½ HR.<br>550°-2 HRS. | 5.6 | .0155 | (3) |
| 122 | | | DEC '57 | 69 | 25.7 | 12 | .0944 | .0865 | | 275°-1½ HR. | 300°-½ HR.<br>350°-2 HRS. | 5.8 | .0170 | (3) |
| 123 | | | DEC '57 | 71 | 26.8 | 12 | .1018 | .0870 | | 275°-1½ HR. | 300°-½ HR.<br>350°-2 HRS. | 5.9 | .0150 | (3) |
| 124 | | | DEC '57 | 67 | 27.8 | 12 | .1048 | .0912 | | 275°-1½ HR. | 300°-½ HR.<br>350°-2 HRS. | | | (3) |
| 126 | 143 | 828 | JULY '57 | 67 | 33.8 | — | .1340 | .1115 | VACUUM | 150°-½ HR.<br>200°-1 HR.<br>250°-½ HR. | 200°-½ HR.<br>250°-½ HR.<br>300°-1 HR.<br>350°-2 HRS.<br>400°-1 HR. | 6.2 | .0867 | |

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE I (CONTD.) HISTORY AND PHYSICAL PROPERTIES OF FIBERGLASS TEST PANELS. (2)

| PANEL NO. | TYPE CLOTH | TYPE RESIN | DATE LAID ROOM TEMP. | BARCOL HARDNESS | RESIN CONTENT (%) | NO OF PLIES | THICKNESS MAX. (IN.) | THICKNESS MIN. (IN.) | TYPE CURE | CURE CYCLE | POST CURE | DIELECTRIC CONSTANT (K) | DISSIPATION FACTOR (D) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 127 | 143 | 828 | JULY '57 | 68 | 32.7 | 12 | .1339 | .1200 | VACUUM | 150°-½ HR<br>200°-1 HR<br>250°-½ HR | 200°-½ HR<br>250°-½ HR<br>300°-1 HR<br>350°-2 HRS<br>400°-1 HR | 5.8 | .060 |
| 128 | | | JULY '57 | 67 | 37.4 | — | .1372 | .1224 | | 150°-½ HR<br>200°-1 HR<br>250°-½ HR | 200°-½ HR<br>250°-½ HR<br>300°-1 HR<br>350°-2 HRS<br>400°-1 HR | 5.4 | .049 |
| 129 | | | JULY '57 | 66 | 43.9 | 12 | .1355 | .1170 | | 150°-½ HR<br>200°-1 HR<br>250°-½ HR | 200°-½ HR<br>250°-½ HR<br>300°-1 HR<br>350°-2 HRS<br>400°-1 HR | 5.7 | .065 |
| 131 | 120 | 4232 | MAY '57 | 68 | 47.4 | 28 | .1343 | .1290 | VACUUM | 200°-2 HRS<br>250°-1 HR<br>300°-½ HR | 200°-½ HR<br>300°-½ HR<br>350°-1 HR<br>400°-1 HR<br>450°-1 HR<br>500°-2 HRS | 4.8 | .009 |
| 132 | | | MAY '57 | 71 | 46.5 | 28 | .1375 | .1170 | | 200°-2 HRS<br>250°-1 HR<br>300°-½ HR | 200°-½ HR<br>300°-½ HR<br>350°-1 HR<br>400°-1 HR<br>450°-1 HR<br>500°-2 HRS | 4.7 | .010 |
| 133 | | | MAY '57 | 74 | 46.6 | 28 | .1250 | .1165 | | 200°-2 HRS<br>250°-1 HR<br>300°-½ HR | 200°-½ HR<br>300°-½ HR<br>350°-1 HR<br>400°-1 HR<br>450°-1 HR<br>500°-2 HRS | 4.7 | .009 |

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE I (CONT'D) HISTORY AND PHYSICAL PROPERTIES OF FIBERGLASS TEST PANELS (2)

| PANEL NO. | TYPE CLOTH | TYPE RESIN | DATE REC'D FROM SHOP | BARCOL HARDNESS | RESIN CONTENT (%) | NO. OF PLIES | THICKNESS MAX. (IN.) | THICKNESS MIN. (IN.) | TYPE CURE | CURE CYCLE | POST CURE | DIELECTRIC CONSTANT (K) | DISSIPATION FACTOR (D) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 134 | 120 | 4232 | MAY '57 | 70 | 46.4 | 28 | .1270 | .1240 | VACUUM | 200°-2 HRS<br>250°-1 HR.<br>300°-½ HR. | 200°-½ HR.<br>300°-½ HR.<br>350°-1 HR.<br>400°-1 HR.<br>450°-1 HR.<br>500°-2 HRS. | 4.8 | .008 |
| 136 | 120 | 506 | MARCH '57 | 63 | 25.4 | 25 | .1184 | .1176 | PRESS | 250°-½ HR. | 300°-½ HR.<br>350°-2 HRS. | 5.2 | .009 |
| 137 | | | MARCH '57 | 71 | 36.9 | 25 | .1200 | .1150 | | 250°-½ HR. | 300°-½ HR.<br>350°-2 HRS. | 4.8 | .010 |
| 138 | | | MAY '57 | 61 | 38.4 | 25 | .1186 | .1150 | | 250°-½ HR. | 300°-½ HR.<br>350°-2 HRS. | 4.8 | .010 |
| 139 | | | MAY '57 | 64 | 35.5 | 28 | .1132 | .1130 | | 250°-¾ HR. | 300°-1 HR.<br>350°-2 HRS. | 4.8 | .010 |
| 141 | 120 | 828 | JULY '57 | 70 | 44.9 | 28 | .1133 | .1292 | VACUUM | 150°-½ HR.<br>200°-1 HR.<br>250°-½ HR. | 200°-½ HR.<br>250°-½ HR.<br>300°-1 HR.<br>350°-2 HRS.<br>400°-1 HR. | 5.3 | .018 |
| 142 | | | JULY '57 | 64 | 45.3 | 28 | .1264 | .1176 | | 150°-½ HR.<br>200°-1 HR.<br>250°-½ HR. | 200°-½ HR.<br>250°-½ HR.<br>300°-1 HR.<br>350°-2 HRS.<br>400°-1 HR. | 5.0 | .019 |
| 143 | | | MARCH '57 | 76 | 56.8 | 26 | .1364 | .1314 | | 150°-½ HR.<br>200°-1 HR.<br>250°-½ HR. | 200°-½ HR.<br>250°-½ HR.<br>300°-1 HR.<br>350°-2 HRS.<br>400°-1 HR. | 4.6 | .016 |

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE I. (CONTD.) HISTORY AND PHYSICAL PROPERTIES OF FIBERGLASS TEST PANELS

(2)

| PANEL NO. | TYPE CLOTH | TYPE RESIN | DATE REC'D FROM SHOP | BARCOL HARDNESS | RESIN CONTENT (%) | NO. OF PLIES | THICKNESS MAX (IN.) | THICKNESS MIN (IN.) | TYPE CURE | CURE CYCLE | POST CURE | DIELECTRIC CONSTANT (K) | DISSIPATION FACTOR (D) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 144 | 120 | 828 | SEPT | 68 | 44.1 | 25 | .1069 | .1034 | VACUUM | 150°-½HR.<br>200°-1 HR.<br>250°-½HR. | 200°-½HR.<br>250°-½HR.<br>300°-1HR.<br>350°-2HRS.<br>400°-1 HR. | 5.6 | — |
| 146 | 183 | 4232 | JUL | 68 | 36.6 | — | .1322 | .1240 | VACUUM | 200°-2HRS.<br>250°-1 HR.<br>300°-½HR. | 250°-½HR.<br>300°-½HR.<br>350°-1 HR.<br>400°-2 HRS.<br>450°-1 HR<br>500°-1 HR<br>50°-2HRS | 5.1 | .0070 |
| 147 | | | MAY '57 | 63 | 25.3 | 7 | .1200 | .1120 | | 200°-2HRS.<br>250°-1 HR.<br>300°-½HR. | 200°-½HR.<br>250°-½HR.<br>300°-1 HR.<br>350°-2HRS.<br>400°-1 HR.<br>450°-1 HR.<br>500°-3HRS. | 4.8 | .0080 |
| 148 | | | MAY '57 | 67 | 32.4 | 7 | .1200 | .1175 | | 200°-2HRS.<br>250°-1 HR.<br>300°-½HR. | 200°-½HR.<br>250°-½HR.<br>300°-1 HR<br>350°-2HRS.<br>400°-1 HR<br>450°-1 HR<br>500°-3HRS. | 5.3 | .0055 |
| 149 | | | UG '57 | 69 | 34.3 | 7 | .1225 | .1190 | | 200°-2HRS.<br>250°-1 HR<br>300°-½HR | 200°-½HR<br>300°-½HR<br>350°-1HR<br>400°-1HR.<br>450°-1HR<br>500°-2HRS | 5.2 | .0093 |

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE I (CONTD.) HISTORY AND PHYSICAL PROPERTIES OF FIBERGLASS TEST PANELS

(2)

| PANEL NO. | TYPE CLOTH | TYPE RESIN | DATE REC'D FROM SHOP | BARCOL HARDNESS | RESIN CONTENT (%) | NO. OF PLIES | THICKNESS MAX. (IN.) | THICKNESS MIN. (IN.) | TYPE CURE | CURE CYCLE | POST CURE | DIELECTRIC CONSTANT (K) | DISSIPATION FACTOR (D) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 151 | 183 | 506 | MARCH '57 | 65 | 35.6 | — | .1330 | .1160 | PRESS | 250°-½ HR | 300°-½ HR. | 5.0 | .011 |
| | | | | | | | | | | | 350°-2 HRS. | | |
| 152 | | | MARCH '57 | 73 | 30.5 | 7 | .1287 | .1140 | | 250°-½ HR. | 300°-½ HR | 5.1 | .011 |
| | | | | | | | | | | | 350°-2 HRS. | | |
| 153 | | | MARCH '57 | 73 | 36.1 | 6 | .1180 | .1159 | | 250°-½ HR | 300°-½ HR | 4.8 | .012 |
| | | | | | | | | | | | 350°-2 HRS. | | |
| 154 | | | APRIL '57 | 58 | 27.0 | 7 | .1280 | .1194 | | 290°-¼ HR. | 300°-½ HR. | 4.7 | .008 |
| | | | | | | | | | | | 350°-2 HRS. | | |
| 156 | 183 | 828 | MAY '57 | 69 | 30.3 | 7 | .1170 | .1159 | VACUUM | 150°-½ HR | 200°-½ HR | 5.4 | .014 |
| | | | | | | | | | | 200°-1 HR | 250°-½ HR | | |
| | | | | | | | | | | 250°-½ HR | 300°-1 HR | | |
| | | | | | | | | | | | 350°-2 HRS. | | |
| | | | | | | | | | | | 400°-1 HR. | | |
| 157 | | | MAY '57 | 69 | 32.5 | 7 | .1280 | .1170 | | 150°-½ HR | 200°-½ HR. | 5.5 | .015 |
| | | | | | | | | | | 200°-1 HR | 250°-½ HR. | | |
| | | | | | | | | | | 250°-½ HR | 300°-1 HR. | | |
| | | | | | | | | | | | 350°-2 HRS. | | |
| | | | | | | | | | | | 400°-1 HR. | | |
| 158 | | | MAY '57 | 71 | 31.9 | 7 | .1230 | .1152 | | 150°-½ HR | 200°-½ HR | 5.5 | .016 |
| | | | | | | | | | | 200°-1 HR | 250°-½ HR | | |
| | | | | | | | | | | 250°-½ HR | 300°-1 HR | | |
| | | | | | | | | | | | 350°-2 HRS. | | |
| | | | | | | | | | | | 400°-1 HR. | | |
| 159 | | | AUGUST '57 | 71 | 30.8 | 7 | .1180 | .1130 | | 150°-½ HR. | 200°-½ HR | 5.5 | .016 |
| | | | | | | | | | | 200°-1 HR | 250°-½ HR. | | |
| | | | | | | | | | | 250°-½ HR. | 300°-1 HR. | | |
| | | | | | | | | | | | 350°-2 HRS. | | |
| | | | | | | | | | | | 400°-1 HR. | | |

# TABLE II

## TEST CONDITIONS FOR VARIOUS GLASS FABRIC AND RESIN COMBINATIONS

| ANGLE OF LOADING (1) | TEST TEMP. | TREATMENT (2) | GLASS FABRIC AND RESIN COMBINATION: 181-828 | 181-506 | 181-4232 | 143-828 | 143-506 | 143-4232 | 120-828 | 120-506 | 120-4232 | 183-828 | 183-506 | 183-4232 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | R.T. | | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ |
| 45 | R.T. | | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ |
| 90 | R.T. | | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ |
| 0 | R.T. | WET | × | × | × | | | | | | | | | |
| 45 | R.T. | WET | × | × | × | | | | | | | | | |
| 90 | R.T. | WET | × | × | × | | | | | | | | | |
| 0 | 300 | ½ HR. AT 300° | × | × | × | × | × | × | | | | | | |
| 45 | 300 | ½ HR. AT 300° | × | × | × | × | × | × | | | | | | |
| 90 | 300 | ½ HR. AT 300° | × | × | × | × | × | × | | | | | | |
| 0 | 300 | 100 HRS. AT 300° | ⊗ | ⊗ | ⊗ | ⊗ | | | ⊗ | | | | | |
| 45 | 300 | 100 HRS. AT 300° | × | × | × | × | × | × | × | × | × | | | |
| 90 | 300 | 100 HRS AT 300° | × | × | × | × | × | × | × | × | × | | | |
| 0 | 300 | 100 HRS. AT 300° TO 40% R.T. ULT. STR. | × | × | × | × | × | × | × | × | | | | |
| 0 | 300 | 100 HRS. AT 300° TO 40% R.T. ULT. STR. | × | × | × | × | × | × | × | × | | | | |
| 0 | 500 | ½ HR. AT 500° | × | × | × | × | × | × | × | × | × | × | × | × |
| 45 | 500 | ½ HR. AT 500° | × | × | × | × | × | × | × | × | × | | | |
| 90 | 500 | ½ HR. AT 500° | × | × | × | × | × | × | × | × | × | | | |

(1) - ANGLE BETWEEN LOAD AND WARP DIRECTION OF SPECIMEN

(2) - FOR 181-828 BEARING SPECIMENS ONLY - SOAKED AT 260° AT 20% AND 40% R.T. ULT. STR. INSTEAD OF 300°

(3) ○-DENOTES CONDITIONS FOR POISSON'S RATIO DETERMINATIONS

CONVAIR — FORT WORTH
TABULATION SHEET

# TABLE III TENSILE TESTS

## 181 CLOTH — CLASS II (4232) RESIN

| SPECIMEN NO. | (1) ANGLE OF LOADING (DEGREES) | (2) AREA (in.²) | PROPORTIONAL LIMIT PRIMARY (PSI) | PROPORTIONAL LIMIT SECONDARY (PSI) | MODULUS PRIMARY (PSI X10³) | MODULUS SECONDARY (PSI X10³) | ULTIMATE T.S. (PSI) | TYPE FAILURE | POISSON'S RATIO | TEST TEMP. (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 101-A-6 | 0 | .0577 | 41,600 | | 2810 | | 41,600 | T | .099 | R.T. | |
| 102-A-4 | | .0612 | — | — | 2550 | — | 39,500 | T | .085 | | |
| 103-A-4 | | .0595 | — | — | 2820 | — | 43,700 | T | .067 | | |
| 105-A-1 | | .0711 | 15,500 | 41,400 | 2670 | 2390 | 41,400 | D | .093 | | |
| AVERAGE | | | | | 2713 | 2390 | 41,300 | | .086 | | |
| 101-B-5 | 45 | .0618 | 5,200 | 8,100 | 1090 | 850 | 18,400 | D | .39 | | |
| 102-B-4 | | .0601 | 5,200 | 9,200 | 1000 | 800 | 17,900 | D | .27 | | |
| 103-B-1 | | .0566 | 5,300 | 9,900 | 1280 | 890 | 20,700 | D | .40 | | |
| 104-B-1 | | .0656 | 6,650 | 9,100 | 1290 | 1020 | 22,200 | D | .29 | | |
| AVERAGE | | | | | 1165 | 890 | 19,800 | | .338 | | |
| 101-C-5 | 90 | .0605 | 41,800 | | 2800 | | 41,800 | T | .068 | | |
| 102-C-4 | | .0605 | 9,900 | —(4) | 2890 | 2780 | 40,700 | T | .100 | | (4) RECORDER TURNED OFF BEFORE FAILURE OCCURRED |
| 103-C-4 | | .0578 | 7,400 | 42,700 | 2800 | 2540 | 42,700 | T | .067 | | |
| 104-C-1 | | .0690 | 12,200 | 32,600 | 2360 | 2230 | 43,000 | T | .079 | | |
| AVERAGE | | | | | 2713 | 2517 | 42,050 | | .0785 | | |
| 101-A-5 | 0 | .0281 | 13,500 | 44,400 | 3120 | 3620 | 44,400 | T | | | WET (3) |
| 102-A-5 | | .0633 | 6,600 | 37,800 | 2530 | 2340 | 37,800 | D | | | |
| 103-A-7 | | .0593 | 21,100 | 40,100 | 2790 | 2650 | 40,100 | T | | | |
| 105-A-7 | | .0327 | 22,200 | 36,700 | 2680 | 2450 | 40,800 | D | | | |
| AVERAGE | | | | | 2780 | 2515 | 40,775 | | | | |
| 101-B-3 | 45 | .0309 | 3,200 | 7,300 | 970 | 790 | 17,000 | D | | | |
| 102-B-1 | | .0572 | 6,100 | 9,500 | 870 | 590 | 15,100 | D | | | |
| 103-B-3 | | .0284 | 4,600 | 8,300 | 880 | 650 | 14,300 | D | | | |
| 104-B-5 | | .0686 | 5,500 | 8,000 | 1020 | 770 | 19,700 | D | | | |
| AVERAGE | | | | | 935 | 700 | 17,025 | | | | |
| 101-C-4 | 90 | .0608 | 19,500 | 34,600 | 2680 | 2630 | 41,300 | T | | | |
| 102-C-5 | | .0614 | 19,600 | 39,300 | 2650 | 2480 | 39,300 | T | | | |
| 103-C-5 | | .0578 | 36,900 | | 2570 | | 36,900 | T | | | |
| 105-C-4 | | .0686 | 31,300 | | 2400 | | 43,500 | D | | | |
| AVERAGE | | | | | 2575 | 2555 | 40,250 | | | | |

(1) - ANGLE BETWEEN LOAD AND WARP DIRECTIONS OF SPECIMEN
(2) - AREA INCLUDED TO INDICATE WIDTH OF SPECIMEN (APPROXIMATELY 1" & ½")
(3) SOAKED IN BOILING DISTILLED WATER FOR 3 HRS. AND IMMEDIATELY TESTED AT ROOM TEMPERATURE

CONVAIR — FORT WORTH
TABULATION SHEET

TABLE III (CONTD.) TENSILE TESTS

181 CLOTH — CLASS II (4232) RESIN

| SPECIMEN NO. | (1) ANGLE OF LOADING (DEGREES) | (2) AREA ($in^2$) | PROPORTIONAL LIMIT PRIMARY (PSI) | PROPORTIONAL LIMIT SECONDARY (PSI) | MODULUS PRIMARY ($PSI \times 10^3$) | MODULUS SECONDARY ($PSI \times 10^3$) | ULTIMATE T.S. (PSI) | TYPE FAILURE | POISSON'S RATIO | TEST TEMP. (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 101-A-1 | 0 | .0311 | 28,100 | | 2570 | | 31,600 | T | | 300 | SOAKED AT 300°F FOR 1/2 HR. |
| 102-A-6 | | .0587 | 12,800 | 34,300 | 2730 | 2540 | 34,300 | D | | | |
| 103-A-5 | | .0568 | 12,800 | 36,400 | 2890 | 2690 | 36,400 | D | | | |
| 104-A-2 | | .0656 | 16,800 | 33,100 | 2860 | 2790 | 43,800 | D | | | |
| AVERAGE | | | | | 2763 | 2673 | 36,525 | | | | |
| 101-B-1 | 45 | .0316 | 4,300 | 6,400 | 960 | 750 | 14,600 | D | | | |
| 102-B-2 | | .0298 | 5,400 | 6,900 | 940 | 860 | 16,500 | D | | | |
| 103-B-2 | | .0290 | 5,200 | 8,200 | 900 | 710 | 16,400 | D | | | |
| 104-B-2 | | .0663 | 3,800 | 6,600 | 1410 | 1080 | 18,400 | D | | | |
| AVERAGE | | | | | 1053 | 850 | 16,475 | | | | |
| 101-C-1 | 90 | .0303 | 14,300 | 34000 | 3130 | 2540 | 34,000 | T | | | |
| 102-C-1 | | .0553 | 9,500 | 41,400 | 3400 | 2950 | 41,400 | T | | | |
| 103-C-1 | | .0582 | 16,800 | 36,300 | 2580 | 2530 | 36,300 | D | | | |
| 104-C-2 | | .0681 | 9,800 | 30,800 | 2840 | 2540 | 37,900 | D | | | |
| AVERAGE | | | | | 2988 | 2640 | 37,650 | | | | |
| 101-A-7 | 0 | .0582 | 8,600 | 32,500 | 2580 | 2350 | 32,500 | D | .063 | | SOAKED AT 300°F FOR 100 HRS. |
| 102-A-7 | | .0589 | 6,600 | 33,000 | 3360 | 2140 | 33,000 | D | .069 | | |
| 103-A-6 | | .0596 | 8,600 | 28,500 | 2920 | 2350 | 34,800 | D | .072 | | |
| 104-A-5 | | .0652 | — | — | 2680 | — | 40,300 | D | — | | |
| AVERAGE | | | | | 2885 | 2280 | 35,150 | | .068 | | |
| 101-B-4 | 45 | .0617 | 2,800 | 6,000 | 970 | 710 | 15,200 | D | | | |
| 102-B-5 | | .0609 | 3,700 | 6,600 | 1030 | 720 | 15,300 | D | | | |
| 103-B-5 | | .0292 | 3,600 | 6,500 | 1080 | 800 | 15,700 | D | | | |
| 104-B-4 | | .0675 | 3,800 | 6,500 | 1280 | 890 | 17,600 | D | | | |
| AVERAGE | | | | | 1090 | 780 | 15,950 | | | | |
| 101-C-2 | 90 | .0302 | 27,800 | | 2410 | | 40,000 | T | | | |
| 102-C-2 | | .0568 | 36,000 | | 2570 | | 40,900 | D | | | |
| 103-C-2 | | .0601 | 22,300 | 41,500 | 2500 | 2400 | 41,500 | T | | | |
| 105-C-5 | | .0656 | 28,900 | | 2480 | | 41,600 | D | | | |
| AVERAGE | | | | | 2490 | 2400 | 41,000 | | | | |

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE III (CONT'D.) TENSILE TESTS

## 181 CLOTH – CLASS II (4232) RESIN

| SPECIMEN NO. | (1) ANGLE OF LOADING (DEGREES) | (2) AREA ($IN^2$) | PROPORTIONAL LIMIT PRIMARY (PSI) | PROPORTIONAL LIMIT SECONDARY (PSI) | MODULUS PRIMARY ($PSI \times 10^3$) | MODULUS SECONDARY ($PSI \times 10^3$) | ULTIMATE T.S. (PSI) | TYPE FAILURE | TEST TEMP. (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|
| 101-A-2 | 0 | .0318 | — | — | 2360 | — | 36,800 | D | 300 | SOAKED AT 300°F FOR |
| 102-A-2 | ↓ | .0277 | 14,800 | 35,400 | 2520 | 2250 | 35,400 | D | ↓ | 100 HRS. WHILE STRESSED |
| 103-A-2 | ↓ | .0303 | 17,500 | 28,000 | 2390 | 2160 | 33,700 | T | ↓ | TO 20% OF ROOM TEMP. |
| 104-A-3 | ↓ | .0315 | — | — | — | — | 34,000 | D | ↓ | ULTIMATE T.S. VALUE |
| AVERAGE | | | | | 2423 | 2205 | 34,975 | | | |
| 101-A-3 | 0 | .0318 | 32,900 | | 2200 | | 32,900 | D | ↓ | SOAKED AT 300°F FOR |
| 102-A-3 | ↓ | .0284 | 17,600 | 40,200 | 3000 | 2640 | 40,200 | T | ↓ | 100 HRS. WHILE STRESSED |
| 103-A-3 | ↓ | .0274 | 18,300 | 37,600 | 2700 | 2510 | 43,100 | D | ↓ | TO 40% OF ROOM TEMP. |
| 104-A-4 | ↓ | .0315 | — | — | — | — | 39,000 | D | ↓ | ULTIMATE T.S. VALUE |
| AVERAGE | | | | | 2633 | 2575 | 38,800 | | | |
| 101-A-4 | 0 | .0288 | 16,600 | 33,900 | 2590 | 2340 | 33,900 | T | 500 | SOAKED AT 500°F. |
| 102-A-1 | ↓ | .0278 | 12,200 | 30,300 | 2610 | 2270 | 30,300 | D | ↓ | FOR 1/2 HR. |
| 103-A-1 | ↓ | .0282 | 26,200 | | 2480 | | 40,400 | D | ↓ | |
| 105-A-6 | ↓ | .0320 | 20,300 | | 2030 | | 28,900 | D | ↓ | |
| AVERAGE | | | | | 2428 | 2305 | 33,375 | | | |
| 101-B-2 | 45 | .0310 | 6,400 | | 560 | | 9,500 | D | ↓ | ↓ |
| 102-B-3 | ↓ | .0281 | 3,600 | 6,200 | 650 | 520 | 10,500 | D | ↓ | ↓ |
| 103-B-4 | ↓ | .0288 | 5,000 | | 540 | | 10,400 | D | ↓ | ↓ |
| 104-B-3 | ↓ | .0320 | 3,400 | 5,400 | 590 | 480 | 9,900 | D | ↓ | ↓ |
| AVERAGE | | | | | 585 | 500 | 10,075 | | | |
| 101-C-3 | 90 | .0296 | 25,700 | | 2560 | | 38,800 | D | ↓ | ↓ |
| 102-C-3 | ↓ | .0282 | 19,800 | 36,900 | 2660 | 2480 | 36,900 | D | ↓ | ↓ |
| 103-C-3 | ↓ | .0287 | 37,600 | | 2350 | | 37,600 | T | ↓ | ↓ |
| 104-C-3 | ↓ | .0337 | 27000 | | 2050 | | 33,500 | D | ↓ | ↓ |
| AVERAGE | | | | | 2405 | 2480 | 36,700 | | | |

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE IV TENSILE TESTS

## 181 CLOTH — CLASS III (506) RESIN

| SPECIMEN NO. | (1) ANGLE OF LOADING (DEGREES) | (2) AREA (in.²) | PROPORTIONAL LIMIT PRIMARY (PSI) | PROPORTIONAL LIMIT SECONDARY (PSI) | MODULUS PRIMARY (PSI x 10³) | MODULUS SECONDARY (PSI x 10³) | ULTIMATE T.S. (PSI) | TYPE FAILURE | POISSON'S RATIO | TEST TEMP. (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 106- | 0 | .0549 | 12,200 | 51,800 | 3220 | 2590 | 51,800 | D | .18 | R.T. | |
| 107-A-2 | | .0775 | 11,300 | 43,200 | 3300 | 2530 | 43,200 | T | .14 | | |
| 108-A-1 | | .0639 | 9,400 | 39,000 | 2610 | 2270 | 39,000 | D | .13 | | |
| 110-A-5 | | .0670 | 12,000 | 44,700 | 3350 | 2470 | 44,700 | D | .13 | | |
| AVERAGE | | | | | 3120 | 2465 | 44,675 | | .145 | | |
| 106-B-1 | 45 | .0579 | 6,700 | 16,900 | 2560 | 1800 | 25,200 | D | .42 | | |
| 107-B-2 | | .0775 | 7,100 | | 1750 | | 29,000 | D | .35 | | |
| 108-B-1 | | .0301 | 8,300 | | 2110 | | 25,100 | D | .37 | | |
| 110-B-5 | | .0660 | 13,300 | | 2270 | | 20,600 | D | .39 | | |
| AVERAGE | | | | | 2173 | 1800 | 24,225 | | .38 | | |
| 106-C-1 | 90 | .0537 | 24,900 | 59,700 | 2880 | 2700 | 59,700 | T | .13 | | |
| 107-C-2 | | .0775 | 8,100 | 28,400 | 2980 | 2200 | 28,400 | T | .15 | | |
| 108-C-1 | | .0520 | 13,800 | 52,700 | 3520 | 2700 | 52,700 | T | .15 | | |
| 110-C-4 | | .0756 | 10,300 | 47,000 | 3230 | 2500 | 47,000 | T | .13 | | |
| AVERAGE | | | | | 3153 | 2525 | 46,950 | | .14 | | |
| 106-A-4 | 0 | .0247 | 54000 | | 2800 | | 54,000 | D | | | WET (3) |
| 107-A-3 | | .0371 | 10,800 | 36,500 | 3470 | 2830 | 36,500 | T | | | |
| 108-A-2 | | .0299 | 12,600 | 46,500 | 2910 | 2480 | 46,500 | D | | | |
| 110-A-7 | | .0337 | 15,000 | 32,200 | 3630 | 2410 | 32,200 | D | | | |
| AVERAGE | | | | | 3203 | 2573 | 42,300 | | | | |
| 106-B-2 | 45 | .0247 | 9,700 | | 2360 | | 24,700 | D | | | |
| 107-B-3 | | .0361 | 10,500 | | 1860 | | 21,900 | D | | | |
| 108-B-2 | | .0275 | 7,700 | | 2410 | | 24,100 | D | | | |
| 110-B-2 | | .0337 | 12,200 | | 2010 | | 23,100 | D | | | |
| AVERAGE | | | | | 2160 | | 23,450 | | | | |
| 106-C-2 | 90 | .0268 | 14,400 | 56,000 | 3670 | 2580 | 56,000 | D | | | |
| 107-C-3 | | .0365 | 8,400 | 32,000 | 3020 | 2410 | 32,000 | T | | | |
| 108-C-2 | | .0258 | 14,600 | 51,600 | 3190 | 2710 | 51,600 | T | | | |
| 110-C-5 | | .0350 | 14,000 | 37,900 | 3270 | 2710 | 37,900 | D | | | |
| AVERAGE | | | | | 3413 | 2603 | 44,375 | | | | |

(1) - ANGLE BETWEEN LOAD AND WARP DIRECTIONS OF SPECIMEN

(2) - AREA INCLUDED TO INDICATE WIDTH OF SPECIMEN (APPROXIMATELY $\frac{1}{4}$" OR $\frac{1}{2}$")

(3) SOAKED IN BOILING DISTILLED WATER FOR 3 HRS. AND IMMEDIATELY TESTED AT ROOM TEMPERATURE.

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE IV (CONT'D.) TENSILE TESTS

## 181 CLOTH — CLASS III (506) RESIN

| SPECIMEN NO. | (1) ANGLE OF LOADING (DEGREES) | (2) AREA ($in^2$) | PROPORTIONAL LIMIT PRIMARY (PSI) | PROPORTIONAL LIMIT SECONDARY (PSI) | MODULUS PRIMARY ($PSI \times 10^3$) | MODULUS SECONDARY ($PSI \times 10^3$) | ULTIMATE T.S. (PSI) | TYPE FAILURE | POISSON'S RATIO | TEST TEMP (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 106-A-1 | 0 | .0308 | 21,200 | 44,300 | 3310 | 2970 | 44,300 | D | | 300 | SOAKED AT 300°F FOR 1/2 HR. |
| 107-A-8 | | .0375 | 12,100 | 27,500 | 3470 | 2670 | 27,500 | T | | | |
| 108-A-3 | | .0581 | 18,100 | 38,200 | 3000 | 2720 | 38,200 | D | | | |
| 110-A-6 | | .0667 | 13,000 | 41,800 | 3100 | 2570 | 41,800 | D | | | |
| AVERAGE | | | | | 3220 | 2733 | 37,950 | | | | |
| 106-B-3 | 45 | .0307 | 5,900 | | 2280 | | 20,900 | D | | | |
| 107-B-1 | | .0727 | 11,100 | | 1030 | | 24,500 | D | | | |
| 108-B-3 | | .0264 | 6,600 | 11,500 | 2200 | 1440 | 23,900 | D | | | |
| 110-B-4 | | .0656 | 11,800 | | 1570 | | 20,100 | D | | | |
| AVERAGE | | | | | 1770 | 1440 | 22,350 | | | | |
| 106-C-4 | 90 | .0265 | 51,900 | | 3160 | | 51,900 | D | | | |
| 107-C-1 | | .0751 | 25,000 | | 2310 | | 25,000 | T | | | |
| 108-C-3 | | .0248 | 47,600 | | 3020 | | 47,600 | D | | | |
| 110-C-5 | | .0705 | 9,900 | 48,400 | 3160 | 2610 | 48,400 | D | | | |
| AVERAGE | | | | | 2913 | 2610 | 43,225 | | | | |
| 106-A-5 | 0 | .0544 | 8,800 | 40,300 | 3890 | 2710 | 40,300 | D | .13 | | SOAKED AT 300°F FOR 100 HRS. |
| 107-A-1 | | .0727 | 5,200 | 39,100 | 3610 | 2740 | 39,100 | T | .11 | | |
| 108-A-4 | | .0620 | 16,100 | 29,400 | 2280 | 2170 | 29,400 | D | .09 | | |
| 110-A-4 | | .0686 | 9,900 | 35,500 | 3090 | 2290 | 35,500 | D | .10 | | |
| AVERAGE | | | | | 3218 | 2478 | 31,075 | | .108 | | |
| 106-B-5 | 45 | .0290 | 6,400 | 10,400 | 1930 | 1290 | 19,400 | D | | | |
| 107-B-4 | | .0363 | 7,700 | | 2760 | | 22,500 | D | | | |
| 108-B-4 | | .0293 | 9,600 | 13,600 | 1990 | 1330 | 25,100 | D | | | |
| 110-B-3 | | .0348 | 5,800 | | 1770 | | 16,000 | D | | | |
| AVERAGE | | | | | 2113 | 1310 | 20,750 | | | | |
| 106-C-5 | 90 | .0252 | 50,100 | | 2880 | | 50,100 | D | | | |
| 107-C-4 | | .0337 | 10,300 | 39,300 | 3120 | 2370 | 39,300 | D | | | |
| 108-C-4 | | .0265 | 11,700 | 39,700 | 3400 | 2740 | 39,700 | D | | | |
| 110-C-1 | | .0327 | 13,300 | 39,700 | 3140 | 2890 | 39,700 | T | | | |
| AVERAGE | | | | | 3135 | 2667 | 34,700 | | | | |

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE IV (CONT'D.) TENSILE TESTS

## 181 CLOTH - CLASS III (506) RESIN

| SPECIMEN NO. | (1) ANGLE OF LOADING (DEGREES) | (2) AREA ($IN^2$) | PROPORTIONAL LIMIT PRIMARY (PSI) | PROPORTIONAL LIMIT SECONDARY (PSI) | MODULUS PRIMARY ($PSI \times 10^3$) | MODULUS SECONDARY ($PSI \times 10^3$) | ULTIMATE T.S. (PSI) | TYPE FAILURE | TEST TEMP. (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|
| 106-A-6 | 0 | .0232 | 13,200 | 53,700 | 4320 | 3370 | 53,700 | D | 300 | SOAKED AT 300°F FOR |
| 107-A-7 | ↓ | .0358 | 17,300 | 35,000 | 3320 | 2890 | 35,000 | T | ↓ | 100 HRS. WHILE STRESSED |
| 108-A-5 | ↓ | .0300 | 14,800 | 35,500 | 3070 | 2590 | 41,200 | D | ↓ | TO 20% OF ROOM TEMP. |
| 110-A-1 | ↓ | .0343 | 13,300 | 33,300 | 3360 | 2770 | 33,300 | T | ↓ | ULTIMATE T.S. VALUE |
| AVERAGE | ↓ | | | | 3518 | 2905 | 40,350 | | ↓ | ↓ |
| 106-A-7 | 0 | .0257 | 28,200 | | 3400 | | 46,700 | T | ↓ | SOAKED AT 300°F FOR |
| 107-A-5 | ↓ | .0354 | 49,900 | | 3860 | | 49,900 | T | ↓ | 100 HRS. WHILE STRESSED |
| 108-A-6 | ↓ | .0289 | 31,800 | | 3030 | | 43,900 | T | ↓ | TO 40% OF ROOM TEMP. |
| 110-A-2 | ↓ | .0342 | 14,700 | 29,300 | 3220 | 2870 | 29,300 | D | ↓ | ULTIMATE T.S. VALUE |
| AVERAGE | ↓ | | | | 3378 | 2870 | 42,500 | | ↓ | ↓ |
| 106-A-2 | 0 | .0307 | 42,800 | | 2500 | | 42,800 | T | 500 | SOAKED AT 500°F. |
| 107-A-4 | ↓ | .0340 | 13,500 | 49,000 | 3930 | 2860 | 49,000 | D | ↓ | FOR 1/2 HR. |
| 108-A-7 | ↓ | .0283 | 12,900 | 36,100 | 2770 | 2350 | (4) | D | ↓ | ↓ |
| 110-A-3 | ↓ | .0345 | 12,000 | 24,900 | 3030 | 2530 | 24,900 | D | ↓ | ↓ |
| AVERAGE | ↓ | | | | 3058 | 2580 | 38,900 | | ↓ | ↓ |
| 106-B-4 | 45 | .0276 | 4,600 | 7,400 | 1520 | 910 | 15,400 | D | ↓ | ↓ |
| 107-B-5 | ↓ | .0343 | 7,000 | 9,600 | 1830 | 1450 | 21,000 | D | ↓ | ↓ |
| 108-B-5 | ↓ | .0270 | 6,700 | | 1420 | | 19,300 | D | ↓ | ↓ |
| 110-B-1 | ↓ | .0337 | 8,200 | 15,900 | 1480 | 1180 | 15,900 | D | ↓ | ↓ |
| AVERAGE | ↓ | | | | 1563 | 1180 | 18,400 | | ↓ | ↓ |
| 106-C-3 | 90 | .0263 | 13,100 | 36,500 | 3440 | 2620 | 51,500 | T | ↓ | ↓ |
| 107-C-5 | ↓ | .0327 | 10,900 | 36,900 | 3140 | 2140 | 36,900 | T | ↓ | ↓ |
| 108-C-5 | ↓ | .0253 | 12,500 | 46,900 | 3210 | 2720 | 46,900 | T | ↓ | ↓ |
| 110-C-2 | ↓ | .0329 | 13,500 | 21,500 | 3210 | 2760 | 21,500 | D | ↓ | ↓ |
| AVERAGE | ↓ | | | | 3288 | 2575 | 39,200 | | ↓ | ↓ |

(4) - SPECIMEN FAILED IN BEARING AT RIVETED DOUBLER.

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE V TENSILE TESTS

## 181 CLOTH — CLASS IV (828) RESIN

| SPECIMEN NO. | (1) ANGLE OF LOADING (DEGREES) | (2) AREA (IN.²) | PROPORTIONAL LIMIT PRIMARY (PSI) | PROPORTIONAL LIMIT SECONDARY (PSI) | MODULUS PRIMARY (PSI X 10³) | MODULUS SECONDARY (PSI X 10³) | ULTIMATE T.S. (PSI) | TYPE FAILURE | POISSON'S RATIO | TEST TEMP. (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 111-A-1 | 0 | .0645 | 13,200 | 39,600 | 2780 | 2490 | 43,700 | T | .16 | R.T. | |
| 112-A-1 | | .0626 | 11,200 | 46,100 | 3030 | 2380 | 46,100 | T | .12 | | |
| 113-A-1 | | .0599 | 17,600 | 35,400 | 3030 | 2230 | 41,400 | T | .12 | | |
| 114-A-1 | | .0622 | 12,900 | 41,700 | 3020 | 2630 | 41,700 | T | .15 | | |
| AVERAGE | | | | | 2965 | 2433 | 43,225 | | .137 | | |
| 111-B-1 | 45 | .0628 | 4,000 | 8,000 | 1950 | 1740 | 25,900 | T | .50 | | |
| 112-B-1 | | .0660 | 5,500 | 9,100 | 1520 | 1130 | 26,100 | S | .47 | | |
| 113-B-1 | | .0621 | 4,500 | 16,100 | 1820 | 1430 | 28,500 | D | .57 | | |
| 114-B-1 | | .0618 | 9,700 | | 1700 | | 23,900 | S | — | | |
| AVERAGE | | | | | 1748 | 1433 | 26,075 | | .513 | | |
| 111-C-2 | 90 | .0317 | 20,100 | 40,100 | 2650 | 2190 | 40,100 | D | .13 | | |
| 112-C-1 | | .0633 | 11,500 | 46,400 | 2910 | 2230 | 46,400 | T | .14 | | |
| 113-C-1 | | .0564 | 18,200 | 38,200 | 3550 | 3160 | 48,900 | T | .22 | | |
| 114-C-1 | | .0571 | 17,500 | 41,100 | 2930 | 2140 | 47,100 | T | .17 | | |
| AVERAGE | | | | | 3010 | 2430 | 44,125 | | .165 | | |
| 111-A-3 | 0 | .0670 | 19,800 | 45,000 | 2760 | 2310 | 45,000 | T | | | WET (3) |
| 112-A-2 | | .0640 | 13,200 | 41,600 | 3120 | 2520 | 41,600 | T | | | |
| 113-A-2 | | .0592 | 17,900 | 45,200 | 3380 | 2230 | 45,200 | T | | | |
| 114-A-2 | | .0619 | 20,000 | 41,800 | 2930 | 2300 | 41,800 | T | | | |
| AVERAGE | | | | | 3048 | 2340 | 43,400 | | | | |
| 111-B-3 | 45 | .0608 | 7,800 | 11,600 | 1400 | 1030 | 29,300 | D | | | |
| 112-B-2 | | .0645 | 3,100 | 8,300 | 1600 | 1360 | 20,200 | D | | | |
| 113-B-2 | | .0600 | 4,200 | 8,900 | 2080 | 1540 | 28,900 | D | | | |
| 114-B-2 | | .0600 | 5,200 | 9,300 | 1530 | 1040 | 23,300 | S | | | |
| AVERAGE | | | | | 1653 | 1243 | 25,425 | | | | |
| 111-C-1 | 90 | .0650 | 18,700 | 38,700 | 2930 | 2230 | 38,700 | T | | | |
| 112-C-2 | | .0645 | 12,000 | 35,800 | 2870 | 2300 | 35,800 | T | | | |
| 113-C-2 | | .0566 | 14,800 | 52,600 | 4150 | 3400 | 52,600 | T | | | |
| 114-C-2 | | .0586 | 17,700 | 40,900 | 2940 | 2220 | 46,900 | T | | | |
| AVERAGE | | | | | 3223 | 2538 | 42,000 | | | | |

(1) - ANGLE BETWEEN LOAD AND WARP DIRECTIONS OF SPECIMEN

(2) - AREA INCLUDED TO INDICATE WIDTH OF SPECIMEN (APPROXIMATELY $\frac{1}{4}$" OR $\frac{1}{2}$")

(3) SOAKED IN BOILING DISTILLED WATER FOR 3 HRS. AND IMMEDIATELY TESTED AT ROOM TEMPERATURE.

CONVAIR — FORT WORTH
TABULATION SHEET

TABLE V (CONTD.) TENSILE TESTS

'181 CLOTH -- CLASS IV (828) RESIN

| SPECIMEN NO. | (1) ANGLE OF LOADING (DEGREES) | (2) AREA (IN²) | PROPORTIONAL LIMIT PRIMARY (PSI) | PROPORTIONAL LIMIT SECONDARY (PSI) | MODULUS PRIMARY (PSI X 10³) | MODULUS SECONDARY (PSI X 10³) | ULTIMATE T.S. (PSI) | TYPE FAILURE | POISSON'S RATIO | TEST TEMP. (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 111-A-2 | 0 | .0621 | 25,300 | | 2270 | | 30,400 | T | | 300 | SOAKED AT 300°F FOR 1/2 HR. |
| 112-A-3 | | .0658 | 28,600 | | 2430 | | 28,600 | T | | | |
| 113-A-3 | | .0593 | 13,500 | 31,400 | 2530 | 2280 | 31,400 | T | | | |
| 114-A-3 | | .0608 | 29,700 | | 2520 | | 29,700 | T | | | |
| AVERAGE | | | | | 2438 | 2280 | 30,025 | | | | |
| 111-B-2 | 45 | .0654 | 3,800 | 6,600 | 730 | 520 | 14,400 | D | | | |
| 112-B-3 | | .0637 | 2,000 | 3,600 | 430 | 250 | 11,100 | D | | | |
| 113-B-3 | | .0602 | 3,600 | 6,000 | 1000 | 590 | 15,000 | D | | | |
| 114-B-5 | | .0274 | 2,100 | 4,000 | 620 | 550 | 12,400 | D | | | |
| AVERAGE | | | | | 695 | 478 | 13,225 | | | | |
| 111-C-4 | 90 | .0652 | 29,700 | | 2230 | | 29,700 | T | | | |
| 112-C-5 | | .0640 | — | — | — | — | 30,300 | T | | | |
| 113-C-3 | | .0555 | 18,900 | 34,600 | 2980 | 2800 | 34,600 | T | | | |
| 114-C-5 | | .0265 | 17,900 | 31,200 | 2320 | 2190 | 31,200 | T | | | |
| AVERAGE | | | | | 2510 | 2495 | 31,450 | | | | |
| 111-A-4 | 0 | .0651 | 9,600 | 29,700 | 2490 | 2200 | 29,700 | T | .071 | | SOAKED AT 300°F FOR 100 HRS. |
| 112-A-4 | | .0672 | 14,900 | 29,100 | 2650 | 2310 | 29,100 | T | .051 | | |
| 113-A-4 | | .0559 | 29,800 | | 2300 | | 29,800 | T | .081 | | |
| 114-A-4 | | .0557 | 11,300 | 40,000 | 3140 | 2650 | 40,000 | T | .088 | | |
| AVERAGE | | | | | 2645 | 2387 | 32,150 | | .0728 | | |
| 111-B-4 | 45 | .0663 | — | — | — | — | 12,400 | S | | | |
| 112-B-4 | | .0621 | 2,700 | 4000 | 750 | 540 | 12,300 | D | | | |
| 113-B-4 | | .0590 | 3,400 | 5,300 | 1030 | 730 | 14,300 | S | | | |
| 114-B-4 | | .0493 | 4,300 | 6,700 | 840 | 560 | 15,600 | S | | | |
| AVERAGE | | | | | 873 | 610 | 13,650 | | | | |
| 111-C-3 | 90 | .0349 | 23,900 | | 1810 | | 23,900 | — | | | |
| 112-C-4 | | .0660 | 22,700 | | 2500 | | 29,700 | T | | | |
| 113-C-4 | | .0565 | 34,100 | | 2750 | | 39,100 | T | | | |
| 114-C-4 | | .0588 | 15,200 | 26,700 | 2390 | 2120 | 26,700 | T | | | |
| AVERAGE | | | | | 2363 | 2120 | 29,850 | | | | |

CONVAIR — FORT WORTH
TABULATION SHEET

# TABLE V (CONTD.) TENSILE TESTS

## 181 CLOTH - CLASS IV (828) RESIN

| SPECIMEN NO. | (1) ANGLE OF LOADING (DEGREES) | (2) AREA ($IN^2$) | PROPORTIONAL LIMIT PRIMARY (PSI) | PROPORTIONAL LIMIT SECONDARY (PSI) | MODULUS PRIMARY ($PSI \times 10^3$) | MODULUS SECONDARY ($PSI \times 10^3$) | ULTIMATE T.S. (PSI) | TYPE FAILURE | TEST TEMP. (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|
| 111-A-5 | 0 | .0303 | 14,400 | 30,900 | 2280 | 2050 | 32,900 | T | 300 | SOAKED AT 300°F FOR |
| 112-A-5 | ↓ | .0339 | — | — | — | — | 35,700 | T | ↓ | 100 HRS. WHILE STRESSED |
| 113-A-5 | ↓ | .0291 | 15,300 | 30,400 | 2880 | 2340 | 32,400 | T | ↓ | TO 20% OF ROOM TEMP. |
| 114-A-5 | ↓ | .0573 | 12,600 | 25,700 | 3230 | 2870 | 25,700 | T | ↓ | ULTIMATE T.S. VALUE |
| AVERAGE | | | | | 2797 | 2420 | 31,175 | | | |
| 111-A-7 | 0 | .0309 | 11,300 | 35,600 | 2350 | 2090 | 35,600 | T | | SOAKED AT 300°F FOR |
| 112-A-6 | ↓ | .0368 | — | — | — | — | 28,100 | T | | 100 HRS. WHILE STRESSED |
| 113-A-6 | ↓ | .0300 | 18,800 | 32,100 | 3060 | 2390 | 32,100 | T | | TO 40% OF ROOM TEMP. |
| 114-A-6 | ↓ | .0286 | 38,400 | | 2450 | | 32,400 | T | | ULTIMATE T.S. VALUE |
| AVERAGE | | | | | 2620 | 2240 | 33,550 | | | |
| 111-A-6 | 0 | .0326 | 13,000 | — | 1680 | — | (4) | — | 500 | SOAKED AT 500°F |
| 112-A-7 | ↓ | .0334 | 9,000 | 23,500 | 1870 | 1530 | 23,500 | D | ↓ | FOR 1/2 HR. |
| 113-A-7 | ↓ | .0310 | 9,400 | 15,800 | 1460 | 980 | 19,100 | D | ↓ | |
| 114-A-7 | ↓ | .0285 | 12,800 | 25,200 | 2040 | 1650 | 27,400 | D | ↓ | |
| AVERAGE | | | | | 1763 | 1388 | 23,333 | | | |
| 111-B-5 | 45 | .0670 | 2,300 | | 150 | | 3,100 | D | | |
| 112-B-5 | ↓ | .0322 | — | | 110 | | 2,800 | D | | |
| 113-B-5 | ↓ | .0296 | 2,400 | | 320 | | 3,300 | D | | |
| 114-B-3 | ↓ | .0573 | 1,900 | | 180 | | 4,200 | D | | |
| AVERAGE | | | | | 190 | | 3,350 | | | |
| 111-C-5 | 90 | .0310 | 12,200 | | 1860 | | (4) | — | | |
| 112-C-3 | ↓ | .0318 | 8,500 | | 1700 | | 17,200 | D | | |
| 113-C-5 | ↓ | .0329 | 9,700 | | 1980 | | 17,000 | D | | |
| 114-C-3 | ↓ | .0559 | 8,100 | 20,300 | 1970 | 1700 | 20,300 | D | | |
| AVERAGE | | | | | 1878 | 1700 | 18,166 | | | |

(4) — FAILED IN BEARING AT RIVETED DOUBLER.

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE VI TENSILE TESTS

## 143 CLOTH - CLASS II (4232) RESIN

| SPECIMEN NO. | (1) ANGLE OF LOADING (DEGREES) | (2) AREA ($in^2$) | PROPORTIONAL LIMIT PRIMARY (PSI) | PROPORTIONAL LIMIT SECONDARY (PSI) | MODULUS PRIMARY ($PSI \times 10^3$) | MODULUS SECONDARY ($PSI \times 10^3$) | ULTIMATE T. S. (PSI) | TYPE FAILURE | POISSON'S RATIO | TEST TEMP. (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 116-A-1 | 0 | .0588 | — | | 4260 | | 65,900 | U | .23 | R.T. | |
| 117-A-1 | ↓ | .0576 | 19,000 | 60,800 | 4340 | 4050 | 60,800 | U | .18 | ↓ | |
| 118-A-1 | ↓ | .0626 | 49,700 | | 4250 | | 49,700 | U | .17 | ↓ | |
| 119-A-1 | ↓ | .0523 | 33,500 | 62,800 | 5250 | 4490 | 62,800 | U | .26 | ↓ | |
| AVERAGE | | | | | 4525 | 4270 | 59,800 | | .21 | | |
| 116-B-1 | 45 | .0633 | 3,200 | 6,600 | 1020 | 680 | 11,800 | S | .15 | | |
| 117-B-1 | ↓ | .0617 | 2,400 | 5,800 | 1010 | 680 | 12,200 | S | .14 | | |
| 118-B-4 | ↓ | .0671 | 3,100 | 5,400 | 930 | 770 | 12,500 | S | .18 | | |
| 119-B-1 | ↓ | .0587 | 2,300 | 4,700 | 1470 | 1110 | 12,100 | S | .17 | | |
| AVERAGE | | | | | 1108 | 810 | 12,150 | | .16 | | |
| 116-C-1 | 90 | .0589 | 4,300 | 6,800 | 680 | 470 | 9,400 | U | .046 | | |
| 117-C-1 | ↓ | .0511 | 2,600 | 7,800 | 780 | 640 | 11,600 | T | .032 | | |
| 118-C-4 | ↓ | .0643 | 3,600 | 5,600 | 700 | 600 | 8,400 | T | .056 | | |
| 119-C-1 | ↓ | .0556 | 3,600 | 6,800 | 870 | 630 | 9,200 | T | .069 | | |
| AVERAGE | | | | | 758 | 585 | 9,600 | | .051 | | |
| 116-A-2 | 0 | .0614 | — | — | 3710 | — | 46,400 | U | .16 | 300 | SOAKED AT 300°F. |
| 117-A-2 | ↓ | .0586 | 42,100 | | 4000 | | 42,100 | U | .13 | ↓ | FOR 100 HRS. |
| 118-A-2 | ↓ | .0670 | 14,500 | 53,100 | 4830 | 4360 | 53,100 | U | .20 | ↓ | |
| 119-A-2 | ↓ | .0546 | 36,600 | 51,300 | 5230 | 4290 | 51,300 | U | — | ↓ | |
| AVERAGE | | | | | 4443 | 4325 | 48,225 | | .163 | | |
| 116-B-2 | 45 | .0304 | 4600 | 7,200 | 820 | 500 | 10,400 | S | | | |
| 117-B-2 | ↓ | .0298 | 2,600 | 4,500 | 740 | 560 | 9,100 | S | | | |
| 118-B-1 | ↓ | .0642 | 4,600 | 6,900 | 780 | 600 | 10,100 | S | | | |
| 119-B-2 | ↓ | .0302 | 5,300 | 7,500 | 870 | 640 | 10,100 | S | | | |
| AVERAGE | | | | | 803 | 575 | 9,925 | | | | |
| 116-C-2 | 90 | .0584 | 2,800 | 5,100 | 690 | 580 | 9,500 | T | | | |
| 117-C-2 | ↓ | .0290 | 7,800 | | 600 | | 7,800 | T | | | |
| 118-C-1 | ↓ | .0670 | 3,600 | 5,600 | 610 | 530 | 7,200 | T | | ↓ | |
| 119-C-2 | ↓ | .0441 | 3,300 | 7,900 | 930 | 740 | 9,900 | T | | ↓ | |
| AVERAGE | | | | | 683 | 617 | 8,600 | | | | |

(1) ANGLE BETWEEN LOAD AND WARP DIRECTIONS OF SPECIMEN

(2) AREA INCLUDED TO INDICATE WIDTH OF SPECIMEN (APPROXIMATELY $\frac{1}{4}$" OR $\frac{1}{2}$")

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE VI (CONT'D.) TENSILE TESTS

## 143 CLOTH – CLASS II (4232) RESIN

| SPECIMEN NO. | (1) ANGLE OF LOADING (DEGREES) | (2) AREA ($IN^2$) | PROPORTIONAL LIMIT PRIMARY (PSI) | PROPORTIONAL LIMIT SECONDARY (PSI) | MODULUS PRIMARY ($PSI \times 10^3$) | MODULUS SECONDARY ($PSI \times 10^3$) | ULTIMATE T.S. (PSI) | TYPE FAILURE | TEST TEMP. (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|
| 116-A-4 | 0 | .0621 | 40,300 | | 4030 | | 40,300 | U | 300 | SOAKED AT 300°F FOR 100 HRS. WHILE STRESSED TO 20% OF ROOM TEMP. ULTIMATE T.S. VALUE |
| 117-A-3 | ↓ | .0505 | 58,600 | | 4710 | | 58,600 | U | ↓ | ↓ |
| 118-A-3 | ↓ | .0660 | 36,100 | | 3980 | | 36,100 | U | ↓ | ↓ |
| 119-A-3 | ↓ | .0529 | 47,600 | | 4590 | | 47,600 | U | ↓ | ↓ |
| AVERAGE | | | | | 4328 | | 45,650 | | | |
| 116-A-5 | 0 | .0299 | 58000 | | 4170 | | 58,000 | U | | SOAKED AT 300°F FOR 100 HRS. WHILE STRESSED TO 40% OF ROOM TEMP. ULTIMATE T.S. VALUE |
| 117-A-4 | ↓ | .0521 | 45,500 | | 4900 | | 45,500 | U | | ↓ |
| 118-A-4 | ↓ | .0610 | 14,400 | 37,500 | 5090 | 4600 | 37,500 | U | | ↓ |
| 119-A-4 | ↓ | .0530 | 44,900 | | 4440 | | 44,900 | U | | ↓ |
| AVERAGE | | | | | 4650 | 4600 | 46,475 | | | |
| 116-A-3 | 0 | .0299 | 41,600 | | 3930 | | 54,000 | D | 500 | SOAKED AT 500°F FOR 1/2 HR. |
| 117-A-5 | ↓ | .0271 | — | — | 3960 | — | 53,600 | U | ↓ | ↓ |
| 118-A-7 | ↓ | .0343 | 54,100 | | 3990 | | 54,100 | U | ↓ | ↓ |
| 119-A-5 | ↓ | .0535 | 8,200 | 48,400 | 4110 | 3670 | 48,400 | U | ↓ | ↓ |
| AVERAGE | | | | | 3998 | 3670 | 52,525 | | | |
| 116-B-3 | 45 | .0310 | 2,600 | 4,700 | 370 | 340 | 6,900 | S | | |
| 117-B-3 | ↓ | .0295 | 2,500 | 4,400 | 440 | 320 | 6,800 | S | | |
| 118-B-5 | ↓ | .0332 | 4,100 | | 300 | | 7,200 | S | | |
| 119-B-3 | ↓ | .0317 | 1,400 | 2,600 | 730 | 520 | 6,300 | S | | |
| AVERAGE | | | | | 460 | 393 | 6,800 | | | |
| 116-C-5 | 90 | .0314 | 3,200 | 4,700 | 430 | 370 | 7,200 | T | | |
| 117-C-3 | ↓ | .0293 | 4,000 | 7,800 | 460 | 420 | 7,800 | T | | |
| 118-C-5 | ↓ | .0335 | 3,900 | | 530 | | 6,400 | T | | |
| 119-C-3 | ↓ | .0300 | 5,500 | | 500 | | 7,300 | T | | |
| AVERAGE | | | | | 420 | 395 | 7,350 | | | |

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE VII TENSILE TESTS

## 143 CLOTH - CLASS III (506) RESIN

| SPECIMEN NO. | (1) ANGLE OF LOADING (DEGREES) | (2) AREA ($in^2$) | PROPORTIONAL LIMIT PRIMARY (PSI) | PROPORTIONAL LIMIT SECONDARY (PSI) | MODULUS PRIMARY ($PSI \times 10^3$) | MODULUS SECONDARY ($PSI \times 10^3$) | ULTIMATE T. S. (PSI) | TYPE FAILURE | POISSON'S RATIO | TEST TEMP. (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 121-A-1 | 0 | .0495 | 76000 | | 5880 | | 76,000 | U | .29 | R.T. | |
| 122-A-1 | | .0457 | 73,200 | | 5810 | | 73,200 | U | .29 | | |
| 123-A-1 | | .0478 | 30,400 | 75,100 | 5630 | 4980 | 75,100 | U | .25 | | |
| 124-A-1 | | .0537 | 72,200 | | 5240 | | 72,200 | U | .28 | | |
| AVERAGE | | | | | 5640 | 4980 | 74,125 | | .278 | | |
| 121-B-1 | 45 | .0494 | 3,000 | 7,200 | 1970 | 1670 | 9,600 | S | .24 | | |
| 122-B-1 | | .0462 | 4,300 | | 2050 | | 11,000 | S | .29 | | |
| 123-B-1 | | .0491 | 6,500 | | 2200 | | 10,200 | S | .22 | | |
| 124-B-1 | | .0535 | 5,100 | | 2210 | | 9,300 | S | .28 | | |
| AVERAGE | | | | | 2108 | 1670 | 10,175 | | .258 | | |
| 121-C-1 | 90 | .0493 | 2,600 | | 2260 | | 7000 | T | .052 | | |
| 122-C-1 | | .0440 | 3,500 | | 2340 | | 7,300 | T | .060 | | |
| 123-C-1 | | .0496 | 3,400 | | 2470 | | 7,000 | T | .061 | | |
| 124-C-1 | | .0503 | 3,900 | | 1490 | | 6,600 | T | .071 | | |
| AVERAGE | | | | | 2140 | | 6,975 | | .061 | | |
| 121-A-2 | 0 | .0491 | 66,500 | | 5550 | | 66,500 | U | .27 | 300 | SOAKED AT 300°F. FOR 100 HRS. |
| 122-A-2 | | .0442 | 51,500 | | 5270 | | 66,100 | U | .26 | | |
| 123-A-2 | | .0478 | 41,800 | 64,400 | 5690 | 5230 | 64,400 | U | .26 | | |
| 124-A-2 | | .0497 | 39,700 | 65,700 | 6290 | 5680 | 65,700 | U | .27 | | |
| AVERAGE | | | | | 5850 | 5455 | 65,675 | | .265 | | |
| 121-B-2 | 45 | .0263 | 5,200 | 7,600 | 1620 | 630 | 9,400 | S | | | |
| 122-B-2 | | .0437 | 4,900 | 7,700 | 1370 | 670 | 9,100 | S | | | |
| 123-B-2 | | .0264 | 5,500 | 7,800 | 1200 | 570 | 9,600 | S | | | |
| 124-B-2 | | .0275 | 5,600 | 7,600 | 1520 | 480 | 8,400 | S | | | |
| AVERAGE | | | | | 1428 | 588 | 8,875 | | | | |
| 121-C-2 | 90 | .0254 | 2,900 | 5,500 | 1230 | 480 | 6,200 | T | | | |
| 122-C-2 | | .0427 | 3,300 | 6,100 | 750 | 470 | 8,500 | T | | | |
| 123-C-2 | | .0239 | 3,100 | 5,200 | 1100 | 580 | 5,900 | T | | | |
| AVERAGE | | | | | 1027 | 510 | 6,867 | | | | |
| AVERAGE | | | | | | | | | | | |

(1) ANGLE BETWEEN LOAD AND WARP DIRECTIONS OF SPECIMEN

(2) AREA INCLUDED TO INDICATE WIDTH OF SPECIMEN (APPROXIMATELY $\frac{1}{4}$" OR $\frac{1}{2}$")

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE VII (CONT'D.) TENSILE TESTS

## 143 CLOTH - CLASS III (506) RESIN

| SPECIMEN NO. | (1) ANGLE OF LOADING (DEGREES) | (2) AREA ($IN^2$) | PROPORTIONAL LIMIT PRIMARY (PSI) | PROPORTIONAL LIMIT SECONDARY (PSI) | MODULUS PRIMARY ($PSI \times 10^3$) | MODULUS SECONDARY ($PSI \times 10^3$) | ULTIMATE T.S. (PSI) | TYPE FAILURE | TEST TEMP. (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|
| 121-A-3 | 0 | .0221 | 57,500 | | 5780 | | 57,500 | D | 500 | SOAKED AT 500°F. |
| 122-A-3 | ↓ | .0216 | 47,900 | | 5220 | | 47,900 | D | ↓ | FOR 1/2 HR. |
| 123-A-3 | | .0236 | 54,000 | | 5380 | | 54,000 | D | | |
| 124-A-3 | | .0230 | 55,500 | | 5490 | | 55,500 | D | | |
| AVERAGE | | | | | 5468 | | 53,725 | | | |
| 121-B-3 | 45 | .0269 | 4,800 | | 1210 | | 7,900 | S | | |
| 122-B-3 | ↓ | .0225 | 4,000 | 6,700 | 1180 | 620 | 8,100 | S | | |
| 123-B-3 | | .0508 | 3,200 | | 1580 | | 7,200 | S | | |
| 124-B-3 | | .0531 | 2,900 | | 1440 | | 7,300 | S | | |
| AVERAGE | | | | | 1353 | 620 | 7,625 | | | |
| 121-C-3 | 90 | .0512 | 2,100 | | 1030 | | 5,400 | T | | |
| 122-C-3 | ↓ | .0451 | 1,900 | | 1560 | | 5,800 | T | | |
| 124-C-3 | | .0282 | 2,200 | | 1770 | | 4,700 | T | | |
| AVERAGE | | | | | 1453 | | 5,300 | | | |

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE VIII TENSILE TESTS

## 143 CLOTH - CLASS IV (828) RESIN

| SPECIMEN NO. | (1) ANGLE OF LOADING (DEGREES) | (2) AREA ($in^2$) | PROPORTIONAL LIMIT PRIMARY (PSI) | PROPORTIONAL LIMIT SECONDARY (PSI) | MODULUS PRIMARY ($PSI \times 10^3$) | MODULUS SECONDARY ($PSI \times 10^3$) | ULTIMATE T.S. (PSI) | TYPE FAILURE | POISSON'S RATIO | TEST TEMP (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 126-A-1 | 0 | .0646 | 24,500 | 65,900 | 4060 | 3790 | 65,900 | U | .19 | R.T. | |
| 127-A-1 | | .0657 | 65,800 | | 3980 | | 65,800 | U | .20 | | |
| 128-A-1 | | .0674 | 17,100 | 59,500 | 3820 | 3520 | 59,500 | T | .19 | | |
| 129-A-1 | | .0659 | 9,900 | 62,600 | 3680 | 3610 | 62,600 | T | .28 | | |
| AVERAGE | | | | | 3885 | 3640 | 63,450 | | .215 | | |
| 126-B-1 | 45 | .0652 | 3,700 | 5,800 | 1320 | 1170 | 14,900 | S | .32 | | |
| 127-B-1 | | .0667 | 3,900 | 5,600 | 1230 | 1050 | 12,600 | S | .29 | | |
| 128-B-1 | | .0662 | 3,500 | 6,600 | 1270 | 1070 | 13,500 | S | .27 | | |
| 129-B-1 | | .0646 | 3,900 | 7,600 | 1240 | 1100 | 14,600 | S | .37 | | |
| AVERAGE | | | | | 1265 | 1098 | 13,900 | | .313 | | |
| 126-C-1 | 90 | .0643 | 5,900 | | 1480 | | 11,700 | T | .091 | | |
| 127-C-1 | | .0608 | 4,000 | 7,000 | 1560 | 1330 | 10,500 | T | .087 | | |
| 128-C-1 | | .0619 | 3,200 | 6,500 | 1620 | 1450 | 10,600 | U | .100 | | |
| 129-C-1 | | .0676 | 3,300 | 6,100 | 1290 | 1270 | 10,100 | U | — | | |
| AVERAGE | | | | | 1488 | 1350 | 10,725 | | .093 | | |
| 126-A-2 | 0 | .0315 | 19,100 | 51,600 | 4000 | 3650 | 51,600 | T | | 300 | SOAKED AT 300°F. FOR 1/2 HR. |
| 127-A-2 | | .0673 | 15,600 | 48,400 | 4100 | 3690 | 48,400 | T | | | |
| 128-A-2 | | .0313 | 14,900 | 42,500 | 3880 | 3670 | 42,500 | T | | | |
| 129-A-2 | | .0295 | 48,300 | | 3250 | | 48,300 | T | | | |
| AVERAGE | | | | | 3808 | 3670 | 47,700 | | | | |
| 126-B-2 | 45 | .0373 | 2,300 | | 290 | | 6,400 | S | | | |
| 127-B-2 | | .0326 | 2,300 | 3,500 | 430 | 290 | 7,500 | S | | | |
| 128-B-2 | | .0323 | 2,000 | 3,500 | 380 | 250 | 7,600 | S | | | |
| 129-B-2 | | .0309 | 1,400 | 2,600 | 390 | 260 | 7,600 | S | | | |
| AVERAGE | | | | | 373 | 267 | 7,275 | | | | |
| 126-C-2 | 90 | .0299 | 3,500 | 5,500 | 500 | 370 | 7,000 | T | | | |
| 127-C-2 | | .0299 | 3,700 | 6,500 | 430 | 370 | 6,500 | T | | | |
| 128-C-2 | | .0635 | 3,000 | 4,600 | 660 | 530 | 7,400 | T | | | |
| 129-C-2 | | .0676 | 3,000 | 6,000 | 510 | 410 | 6,000 | T | | | |
| AVERAGE | | | | | 525 | 420 | 6,725 | | | | |

(1) ANGLE BETWEEN LOAD AND WARP DIRECTIONS OF SPECIMEN

(2) AREA INCLUDED TO INDICATE WIDTH OF SPECIMEN (APPROXIMATELY $\frac{1}{2}$" OR $\frac{1}{4}$")

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE IX TENSILE TESTS

## 120 CLOTH - CLASS II (4232), III (506), AND IV (828) RESINS

| SPECIMEN NO. | TYPE RESIN | (1) ANGLE OF LOADING (DEGREES) | (2) AREA ($in^2$) | PROPORTIONAL LIMIT PRIMARY (PSI) | PROPORTIONAL LIMIT SECONDARY (PSI) | MODULUS PRIMARY (PSI X $10^3$) | MODULUS SECONDARY (PS. X $10^3$) | ULTIMATE T. S. (PSI) | TYPE FAILURE | TEST TEMP. (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 131-A-1 | 4232 | 0 | .0332 | 25,000 | | 2260 | | 25,000 | D | R.T. | |
| 132-A-1 | | | .0337 | 27,200 | | 2220 | | 27,200 | T | | |
| 133-A-1 | | | .0296 | 7,600 | 29,600 | 2530 | 22.00 | 29,600 | D | | |
| 134-A-1 | | | .0312 | 10,300 | 29,200 | 2730 | 2300 | 29,200 | T | | |
| AVERAGE | | | | | | 2435 | 2250 | 27,750 | | | |
| 131-A-2 | | | .0335 | 17,000 | | 1860 | | 17,000 | T | 500 | SOAKED AT 500°F FOR ½ HR. |
| 132-A-2 | | | .0348 | 15,900 | | 1930 | | 15,900 | T | | |
| 133-A-2 | | | .0310 | 22,400 | | 2000 | | 22,400 | D | | |
| 134-A-2 | | | .0313 | 10,400 | 16,800 | 2100 | 1970 | 21,100 | D | | |
| AVERAGE | | | | | | 1973 | 1970 | 19,100 | | | |
| 136-A-1 | 506 | | .0290 | 41,300 | | 2910 | | 50,700 | D | R.T. | |
| 137-A-1 | | | .0304 | 14,800 | 43,900 | 3290 | 2630 | 43,900 | D | | |
| 138-A-1 | | | .0291 | 16,300 | 39,500 | 2910 | 2470 | 39,500 | D | | |
| 139-A-1 | | | .0281 | 16,700 | 38,300 | 3110 | 2490 | 38,300 | T | | |
| AVERAGE | | | | | | 3055 | 2530 | 43,100 | | | |
| 141-A-1 | 828 | | .0322 | 14,000 | 40,400 | 2640 | 2180 | 40,400 | T | R.T. | |
| 142-A-1 | | | .0288 | 13,000 | 43,800 | 2600 | 2350 | 43,800 | T | | |
| 143-A-1 | | | .0320 | 17,800 | 31,300 | 2430 | 1750 | 31,300 | D | | |
| 144-A-1 | | | .0522 | 15,800 | 27,400 | 3210 | 2740 | 37,100 | T | | |
| AVERAGE | | | | | | 2720 | 2255 | 38,650 | | | |

(1) ANGLE BETWEEN LOAD AND WARP DIRECTIONS OF SPECIMEN.
(2) AREA INCLUDED TO INDICATE WIDTH OF SPECIMEN (APPROXIMATELY ¼" OR ½")

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE X TENSILE TESTS

## 183 CLOTH — CLASS II (4232), III (506) AND IV (828) RESIN

| SPECIMEN NO. | TYPE RESIN | (1) ANGLE OF LOADING (DEGREES) | (2) AREA ($IN^2$) | PROPORTIONAL LIMIT PRIMARY (PSI) | PROPORTIONAL LIMIT SECONDARY (PSI) | MODULUS PRIMARY ($PSI \times 10^3$) | MODULUS SECONDARY ($PSI \times 10^3$) | ULTIMATE T. S. PSI | TYPE FAILURE | TEST TEMP (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 146-A-1 | 4232 | 0 | .0326 | 20,400 | 33,700 | 2580 | 2450 | 44000 | D | R.T. | |
| 147-A-1 | | | .0286 | 16,100 | 30,700 | 3100 | 2740 | 40,800 | D | | |
| 148-A-1 | | | .0287 | 14,200 | 27,000 | 2470 | 2270 | 34,500 | D | | |
| 149-A-1 | | | .0606 | 25,200 | | 2520 | | 42,000 | D | | |
| AVERAGE | | | | | | 2668 | 2487 | 40,325 | | | |
| 146-A-2 | | | .0328 | 19,100 | | 2210 | | 34,400 | D | 500 | SOAKED AT 500°F. |
| 147-A-2 | | | .0295 | 12,600 | | 2580 | | 31,500 | D | | FOR 1/2 HR. |
| 148-A-2 | | | .0291 | 17,200 | | 2210 | | 30,600 | D | | |
| 149-A-2 | | | .0296 | 17,200 | | 1840 | | 25,100 | D | | |
| AVERAGE | | | | | | 2210 | | 30,400 | | | |
| | | | | | | 2210 | | | | | |
| 151-A-1 | 506 | | .0293 | 16,200 | 32,600 | 3200 | 2470 | 32,600 | T | R.T. | |
| 152-A-1 | | | .0319 | 11,100 | 26,800 | 3010 | 2510 | 26,800 | D | | |
| 153-A-1 | | | .0288 | 35,600 | | 2520 | | 35,600 | T | | |
| 154-A-1 | | | .0306 | 18,100 | 37,600 | 2400 | 2080 | 37,600 | D | | |
| AVERAGE | | | | | | 2783 | 2353 | 33,150 | | | |
| 156-A-1 | 828 | | .0292 | 12,800 | 49,200 | 3770 | 2390 | 49200 | T | R.T. | |
| 157-A-1 | | | .0304 | 11,500 | — | 3040 | 2390 | 37,000 | T | | |
| 158-A-1 | | | .0284 | 16,900 | 44,200 | 2640 | 2040 | 44,200 | T | | |
| 159-A-1 | | | .0590 | 14,000 | — | 3600 | 2760 | 50,700 | T | | |
| AVERAGE | | | | | | 3263 | 2395 | 45,275 | | | |

(1) ANGLE BETWEEN LOAD AND WARP DIRECTIONS OF SPECIMEN
(2) AREA INCLUDED TO INDICATE WIDTH OF SPECIMEN (APPROXIMATELY 1/4" OR 1/2")

CONVAIR — FORT WORTH
TABULATION SHEET

# TABLE XI BEARING TESTS
## 181 CLOTH - CLASS II (4232) RESIN

| SPECIMEN NO. | (1) ANGLE OF LOADING (DEGREES) | DIAMETER OF PIN (IN.) | GAGE (IN.) | AREA (IN²) | YIELD (2) (LBS.) | STRESS (PSI) | ULTIMATE STR. (LBS.) | ULTIMATE STR. (PSI) | TYPE FAILURE | TEST TEMP. OF | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 101-A-1 | 0 | .1875 | .1230 | .0231 | 600 | 26,000 | 950 | 41,100 | BEARING | R.T. | |
| 102-A-1 | | | .1210 | .0227 | 620 | 27,300 | 985 | 43,400 | | | |
| 103-A-1 | | | .1115 | .0209 | 610 | 29,200 | 920 | 40,200 | | | |
| 105-A-2 | | | .1394 | .0261 | 885 | 33,900 | 1265 | 48,500 | | | |
| AVERAGE | | | | | | 29,100 | | 43,300 | | | |
| 101-B-2 | 45 | | .1222 | .0229 | 700 | 30,600 | 1095 | 47,800 | | | |
| 102-B-1 | | | .1245 | .0233 | 530 | 22700 | 1230 | 52,800 | | | |
| 103-B-1 | | | .1095 | .0205 | 680 | 33,100 | 898 | 43,800 | | | |
| 104-B-1 | | | .1303 | .0244 | 785 | 32,200 | 1115 | 45,700 | | | |
| AVERAGE | | | | | | 29,650 | | 47,525 | | | |
| 101-C-1 | 90 | | .1270 | .0238 | 670 | 28200 | 1055 | 44300 | | | |
| 102-C-1 | | | .1275 | .0239 | 670 | 28,000 | 1110 | 46,400 | | | |
| 103-C-1 | | | .1095 | .0205 | 650 | 31,700 | 925 | 45,100 | | | |
| 105-C-1 | | | .1310 | .0246 | 845 | 34,400 | 1220 | 49,600 | | | |
| AVERAGE | | | | | | 30,575 | | 46,350 | | | |
| 101-A-3 | 0 | | .1260 | .0236 | 535 | 22,600 | 740 | 31,300 | | | WET (3) |
| 102-A-3 | | | .1190 | .0223 | 540 | 24,200 | 745 | 33,400 | | | |
| 103-A-4 | | | .1080 | .0203 | 515 | 25,400 | 665 | 32,800 | | | |
| 105-A-4 | | | .1370 | .0257 | 655 | 25,500 | 970 | 37,800 | | | |
| AVERAGE | | | | | | 24,425 | | 33,825 | | | |
| 100-B-2 | 45 | | .1360 | .0255 | 500 | 19600 | 795 | 31,200 | | | |
| 101-B-4 | | | .1250 | .0234 | 525 | 22,400 | 765 | 32,700 | | | |
| 102-B-3 | | | .1220 | .0229 | 535 | 23,400 | 870 | 38,000 | | | |
| 103-B-2 | | | .1150 | .0216 | 525 | 24,300 | 790 | 36,600 | | | |
| AVERAGE | | | | | | 22,425 | | 34,625 | | | |
| 101-C-3 | 90 | | .1260 | .0236 | 570 | 24,200 | 800 | 33,900 | | | |
| 102-C-3 | | | .1270 | .0238 | 580 | 24,400 | 865 | 36,100 | | | |
| 103-C-4 | | | .1080 | .0203 | 525 | 25,900 | 680 | 33,500 | | | |
| 105-C-3 | | | .1350 | .0253 | 705 | 27,900 | 1030 | 40,700 | | | |
| AVERAGE | | | | | | 25,600 | | 36,050 | | | |

(1) ANGLE BETWEEN LOAD AND WARP DIRECTIONS OF SPECIMEN
(2) STRESS AT WHICH BEARING HOLE WAS DEFORMED 4% OF ITS ORIGINAL DIAMETER (.0075 ")
(3) SOAKED IN BOILING DISTILLED WATER FOR 3 HRS. AND IMMEDIATELY TESTED AT ROOM TEMPERATURE

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE XI (CONT'D.) BEARING TESTS

## 181 CLOTH — CLASS II (4232) RESIN

| SPECIMEN NO. | (1) ANGLE OF LOADING (DEGREES) | DIAMETER OF PIN (IN.) | GAGE (IN.) | AREA (IN²) | YIELD (2) (LBS.) | STRESS (PSI) | ULTIMATE STR. (LB.) | (PSI) | TYPE FAILURE | TEST TEMP (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 101-A-2 | 0 | .1875 | .1240 | .0233 | 540 | 23,200 | 775 | 33,300 | BEARING | 300 | SOAKED AT 300°F FOR ½ HR. |
| 102-A-2 | | | .1250 | .0234 | 485 | 20,700 | 850 | 36,300 | | | |
| 103-A-2 | | | .1085 | .0203 | 460 | 22,600 | 700 | 34,500 | | | |
| 105-A-3 | | | .1357 | .0258 | 670 | 26,000 | 985 | 38,200 | | | |
| AVERAGE | | | | | | 23,125 | | 35,575 | | | |
| 101-B-3 | 45 | | .1272 | .0239 | 565 | 23,600 | 885 | 37000 | | | |
| 102-B-2 | | | .1135 | .0213 | 550 | 25,800 | 805 | 37,800 | | | |
| 103-B-3 | | | .1117 | .0209 | 555 | 26,600 | 785 | 37,600 | | | |
| 104-B-2 | | | .1311 | .0246 | 715 | 29,100 | 1020 | 41,500 | | | |
| AVERAGE | | | | | | 26,275 | | 38,475 | | | |
| 101-C-2 | 90 | | .1231 | .0231 | 620 | 26,800 | 890 | 38,500 | | | |
| 102-C-2 | | | .1240 | .0233 | 625 | 26,800 | 905 | 38,800 | | | |
| 103-C-2 | | | .1115 | .0209 | 610 | 29,100 | 780 | 37,500 | | | |
| 105-C-2 | | | .1366 | .0256 | 695 | 27,200 | 970 | 38,700 | | | |
| AVERAGE | | | | | | 27,475 | | 38,325 | | | |
| 101-A-4 | 0 | | .1190 | .0223 | 580 | 26,000 | 810 | 36,300 | | | SOAKED AT 300°F FOR 1/10 HRS. |
| 102-A-4 | | | .1210 | .0227 | 545 | 24,000 | 725 | 32,000 | | | |
| 103-A-7 | | | .1040 | .0195 | 510 | 26,200 | 755 | 38,700 | | | |
| AVERAGE | | | | | | 25 400 | | 35,667 | | | |
| 100-B-1 | 45 | | .1290 | .0242 | 625 | 25,800 | 865 | 35,800 | | | |
| 102-B-4 | | | .1180 | .0221 | 565 | 25,500 | 905 | 40,900 | | | |
| 103-B-5 | | | .1100 | .0206 | 525 | 25,500 | 765 | 37,100 | | | |
| AVERAGE | | | | | | 25,600 | | 37,930 | | | |
| 100-C-1 | 90 | | .1270 | .0238 | 535 | 22,500 | 750 | 31,500 | | | |
| 101-C-4 | | | .1180 | .0221 | 580 | 26,200 | 810 | 36,600 | | | |
| 102-C-4 | | | .1240 | .0233 | 545 | 23,400 | 820 | 35,300 | | | |
| 103-C-5 | | | .1070 | .0201 | 585 | 29,200 | 755 | 37,600 | | | |
| AVERAGE | | | | | | 25,325 | | 35,250 | | | |

CONVAIR—FORT WORTH

TABULATION SHEET

TABLE XI (CONT'D.) BEARING TESTS

181 CLOTH – CLASS II (4232) RESIN

| SPECIMEN NO. | (1) ANGLE OF LOADING (DEGREES) | DIAMETER OF PIN (IN.) | GAGE (IN.) | AREA (IN²) | YIELD (2) (LBS) | STRESS (PSI) | ULTIMATE STR. (LBS.) | ULTIMATE STR. (PSI) | TYPE FAILURE | TEST TEMP. (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 101-A-5 | 0 | .1875 | .1250 | .0234 | 620 | 26,500 | 765 | 32,700 | BEARING | 300 | SOAKED AT 300°F FOR |
| 102-A-5 | | | .1155 | .0217 | 705 | 32,500 | 750 | 34,600 | | | 100 HRS. WHILE STRESSED |
| 103-A-5 | | | .1092 | .0205 | 495 | 24,100 | 685 | 33,400 | | | TO 20% OF ROOM TEMP. |
| 105-A-5 | | | .1380 | .0259 | 600 | 23,200 | 970 | 37,500 | | | ULTIMATE STR. VALUE |
| AVERAGE | | | | | | 26,575 | | 34,550 | | | |
| 101-A-6 | 0 | | .1255 | .0235 | 610 | 26,000 | 790 | 33,600 | | | SOAKED AT 300°F. FOR |
| 102-A-6 | | | .1226 | .0230 | 745 | 32,300 | 850 | 37,000 | | | 100 HRS. WHILE STRESSED |
| 103-A-6 | | | .1142 | .0214 | 445 | 20,800 | 775 | 36,200 | | | TO 40% OF ROOM TEMP. |
| 105-A-6 | | | .1313 | .0246 | 655 | 26,600 | 950 | 38,600 | | | ULTIMATE STR. VALUE |
| AVERAGE | | | | | | 26,425 | | 36,350 | | | |
| 100-A-7 | 0 | | .1285 | .0241 | 480 | 19,900 | 704 | 29,200 | | 500 | SOAKED AT 500°F |
| 101-A-7 | | | .1200 | .0225 | 463 | 20,600 | 615 | 27,300 | | | FOR 1/2 HR. |
| 102-A-7 | | | .1210 | .0227 | 475 | 20,900 | 588 | 25,900 | | | |
| 103-A-3 | | | .1075 | .0202 | 350 | 17,300 | 507 | 25,100 | | | |
| AVERAGE | | | | | | 19,675 | | 26,875 | | | |
| 101-B-5 | 45 | | .1240 | .0233 | 410 | 17,600 | 700 | 30,100 | | | |
| 102-B-5 | | | .1220 | .0229 | 400 | 17,500 | 602 | 26,300 | | | |
| 103-B-4 | | | .1100 | .0206 | 360 | 17,500 | 558 | 27,000 | | | |
| 100-B-3 | | | .1285 | .0241 | 440 | 18,300 | 623 | 25,900 | | | |
| AVERAGE | | | | | | 17,725 | | 27,325 | | | |
| 101-C-5 | 90 | | .1160 | .0218 | 463 | 21,200 | 588 | 27,000 | | | |
| 102-C-5 | | | .1240 | .0233 | 418 | 17,900 | 631 | 27,100 | | | |
| 103-C-3 | | | .1145 | .0215 | 390 | 18,100 | 500 | 23,200 | | | |
| 105-C-4 | | | .1350 | .0253 | 480 | 19,000 | 645 | 23,300 | | | |
| AVERAGE | | | | | | 19,050 | | 25,150 | | | |

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE XII BEARING TESTS

## 181 CLOTH - CLASS III (506) RESIN

| SPECIMEN NO. | (1) ANGLE OF LOADING (DEGREES) | DIAMETER OF PIN (IN.) | GAGE (IN.) | AREA (IN²) | YIELD (2) (LBS.) | YIELD STRESS (PSI) | ULTIMATE STR. (LBS.) | ULTIMATE STR. (PSI) | TYPE FAILURE | TEST TEMP. (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 106-A-2 | 0 | .1875 | .1122 | .0210 | 800 | 38000 | 1110 | 52,800 | BEARING | R.T. | |
| 107-A-1 | | | .1370 | .0257 | 1050 | 40,900 | 1500 | 58,400 | | | |
| 108-A-1 | | | .1330 | .0249 | 730 | 29300 | 940 | 37,700 | | | |
| 110-A-1 | | | .1400 | .0263 | 750 | 28,600 | 1195 | 45,500 | | | |
| AVERAGE | | | | | | 34,200 | | 48,600 | | | |
| 106-B-1 | 45 | | .1140 | .0214 | 620 | 28,000 | 1150 | 53,800 | | | |
| 107-B-2 | | | .1500 | .0281 | 1070 | 38,100 | 1370 | 48,700 | | | |
| 108-B-1 | | | .1300 | .0244 | 600 | 24,600 | 1020 | 41,900 | | | |
| 110-B-1 | | | .1400 | .0263 | 525 | 20,000 | 1255 | 47,800 | | | |
| AVERAGE | | | | | | 27,675 | | 48,050 | | | |
| 106-C-1 | 90 | | .1125 | .0211 | 750 | 35,600 | 1125 | 53300 | | | |
| 107-C-1 | | | .1520 | 0285 | 915 | 32,100 | 1325 | 46,500 | TENSION SHEAR | | |
| 108-C-1 | | | .1100 | .0206 | 900 | 43,600 | 1085 | 52,600 | BEARING | | |
| 110-C-1 | | | .1370 | .0257 | 565 | 22,000 | 1225 | 47,700 | | | |
| AVERAGE | | | | | | 33,325 | | 50,025 | | | |
| 106-A-3 | 0 | | — | — | — | — | — | — | | WET (3) | |
| 107-A-2 | | | .1100 | .0206 | 925 | 44,700 | 1050 | 51,000 | | | |
| 108-A-2 | | | .1285 | 0241 | 800 | 33,200 | 830 | 34,400 | | | |
| 110-A-2 | | | .1390 | .0261 | 920 | 35,200 | 945 | 36,200 | | | |
| AVERAGE | | | | | | 37,766 | | 40,533 | | | |
| 106-B-2 | 45 | | .1110 | .0208 | 850 | 40,900 | 955 | 45,900 | | | |
| 107-B-3 | | | .1480 | .0278 | 1000 | 36,000 | 1170 | 42,800 | | | |
| 108-B-2 | | | .1110 | .0208 | 785 | 37,700 | 915 | 44,000 | | | |
| 110-B-2 | | | .1160 | .0218 | 875 | 40,100 | 950 | 43,600 | | | |
| AVERAGE | | | | | | 38,675 | | 44,075 | | | |
| 106-C-2 | 90 | | .1040 | .0195 | 830 | 42,600 | 970 | 50,800 | | | |
| 107-C-2 | | | .1440 | .0270 | 775 | 28,700 | 845 | 31,300 | | | |
| 108-C-2 | | | .1180 | .0221 | 710 | 32,100 | 900 | 40,700 | | | |
| 110-C-2 | | | .1370 | .0257 | 885 | 34,400 | 1015 | 39,500 | | | |
| AVERAGE | | | | | | 34,450 | | 40,575 | | | |

(1) ANGLE BETWEEN LOAD AND PLATE DIRECTION OF SPECIMEN

(2) STRESS AT WHICH BEARING HOLE WAS DEFORMED 4% OF ITS ORIGINAL DIAMETER (.0075")

(3) SOAKED IN BOILING DISTILLED WATER FOR 3 HRS. AND IMMEDIATELY TESTED AT ROOM TEMPERATURE

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE XII (CONT'D.) BEARING TESTS

## 181 CLOTH - CLASS III (506) RESIN

| SPECIMEN NO. | (1) ANGLE OF LOADING (DEGREES) | DIAMETER OF PIN (IN.) | GAGE (IN.) | AREA ($IN^2$) | YIELD (2) (LBS.) | STRESS (PSI) | ULTIMATE STR. (LBS.) | ULTIMATE STR. (PSI) | TYPE FAILURE | TEST TEMP. (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 106-A-1 | 0 | .1875 | .1099 | .0206 | 800 | 38,800 | 820 | 39,800 | BEARING | 300 | SOAKED AT 300°F FOR 1/2 HR. |
| 107-A-3 | | | .1330 | .0249 | 960 | 38,600 | 1215 | 48,800 | | | |
| 108-A-3 | | | .1147 | .0215 | 785 | 36,500 | 930 | 43,200 | | | |
| 110-A-3 | | | .1243 | .0233 | 625 | 26,800 | 640 | 27,500 | | | |
| AVERAGE | | | | | | 35,175 | | 39,825 | | | |
| 106-B-3 | 45 | | .1170 | .0219 | 870 | 39,700 | 950 | 43,400 | | | |
| 107-B-5 | | | .1450 | .0272 | 950 | 34,800 | 1215 | 44,700 | | | |
| 108-B-3 | | | .1095 | .0205 | 575 | 28,000 | 655 | 31,900 | | | |
| 110-B-3 | | | .1228 | .0230 | 780 | 33,900 | 860 | 37,300 | | | |
| AVERAGE | | | | | | 34,125 | | 39,325 | | | |
| 106-C-3 | 90 | | .0990 | .0186 | 870 | 46,800 | 910 | 48,900 | | | |
| 107-C-3 | | | .1450 | .0272 | 925 | 34,000 | 1180 | 43,400 | | | |
| 108-C-3 | | | .0950 | .0178 | 780 | 43,800 | 865 | 48,600 | | | |
| 110-C-3 | | | .1375 | .0258 | 815 | 31,600 | 995 | 38,600 | | | |
| AVERAGE | | | | | | 39,050 | | 44,875 | | | |
| 106-A-4 | 0 | | .1170 | .0219 | 750 | 34,200 | 955 | 43600 | | | SOAKED AT 300°F FOR 100 HRS. |
| 107-A-4 | | | .1450 | .0272 | 920 | 33,800 | 1285 | 47,200 | | | |
| 108-A-4 | | | .1140 | .0214 | 790 | 36,900 | 895 | 41,800 | | | |
| 110-A-4 | | | .1300 | .0244 | 890 | 36,500 | 1000 | 41,000 | | | |
| AVERAGE | | | | | | 35,350 | | 43,400 | | | |
| 106-B-4 | 45 | | .1150 | .0216 | 775 | 35,900 | 920 | 42600 | | | |
| 107-B-4 | | | .1370 | .0257 | 1090 | 42,400 | 1290 | 50,200 | | | |
| 108-B-4 | | | .1130 | .0212 | 895 | 42,200 | 990 | 46,700 | | | |
| 110-B-4 | | | .1350 | .0253 | 990 | 39,100 | 1005 | 39700 | | | |
| AVERAGE | | | | | | 39,900 | | 44,800 | | | |
| 106-C-4 | 90 | | .1150 | .0216 | 700 | 32,400 | 995 | 46,100 | | | |
| 107-C-4 | | | .1440 | .0270 | 920 | 34100 | 1185 | 43,900 | | | |
| 108-C-4 | | | .1080 | .0203 | 690 | 34,000 | 880 | 43,300 | | | |
| 110-C-4 | | | .1340 | .0251 | 850 | 33,900 | 1065 | 42,400 | | | |
| AVERAGE | | | | | | 33,600 | | 43,925 | | | |

CONVAIR — FORT WORTH

TABULATION SHEET

TABLE XII (CONTD.) BEARING TESTS

181 CLOTH - CLASS III (506) RESIN

| SPECIMEN NO. | (1) ANGLE OF LOADING (DEGREES) | DIAMETER OF PIN (IN.) | GAGE (IN.) | AREA (IN²) | YIELD (2) (LBS.) | STRESS (PSI) | ULTIMATE STR. (LBS.) | ULTIMATE STR. (PSI) | TYPE FAILURE | TEST TEMP. (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 106-A-5 | 0 | .1875 | .1020 | .0191 | — | — | 770 | 40,300 | BEARING | 300 | SOAKED AT 300°F FOR |
| 107-A-5 | | | .1225 | .0230 | 1050 | 45,700 | 1165 | 50,700 | TENSION SHEAR | | 100 HRS WHILE STRESSED |
| 108-A-5 | | | .1272 | .0239 | 700 | 29,400 | 755 | 31,700 | BEARING | | TO 20% OF ROOM TEMP |
| 110-A-5 | | | .1215 | .0228 | 960 | 42,100 | 985 | 43,200 | | | ULTIMATE STR. VALUE |
| AVERAGE | | | | | | 39,067 | | 41,475 | | | |
| 106-A-6 | 0 | | .1100 | .0206 | 830 | 40,300 | 905 | 43,900 | | | SOAKED AT 300°F FOR |
| 107-A-6 | | | .1383 | .0259 | 1020 | 39,300 | 1165 | 44,900 | | | 100 HRS. WHILE STRESSED |
| 108-A-6 | | | .1138 | .0213 | — | — | 1030 | 48,300 | | | TO 40% OF ROOM TEMP. |
| 110-A-6 | | | .1220 | .0229 | 945 | 41,300 | 955 | 41,700 | | | ULTIMATE STR. VALUE |
| AVERAGE | | | | | | 40,300 | | 44,700 | | | |
| 106-A-7 | 0 | | .1022 | .0192 | 610 | 31,800 | 782 | 40,800 | | 500 | SOAKED AT 500°F |
| 107-A-7 | | | .1405 | .0263 | 884 | 33,600 | 1165 | 44,200 | | | FOR 1/2 HR. |
| 108-A-7 | | | .1140 | .0214 | 600 | 28,000 | 852 | 39,900 | | | |
| 110-A-7 | | | .1290 | .0242 | 683 | 28,200 | 888 | 36,700 | | | |
| AVERAGE | | | | | | 30,400 | | 40,400 | | | |
| 106-B-5 | 45 | | .1181 | .0221 | 703 | 31,800 | 803 | 36,300 | | | |
| 107-B-1 | | | .1440 | .0270 | 600 | 22,200 | 947 | 35,100 | | | |
| 108-B-5 | | | .1210 | .0227 | 650 | 28,600 | 780 | 34,400 | | | |
| 110-B-5 | | | .1390 | .0261 | 560 | 21,500 | 940 | 36,100 | | | |
| AVERAGE | | | | | | 26,025 | | 35,475 | | | |
| 106-C-5 | 90 | | .1196 | .0224 | 623 | 27,800 | 798 | 35,600 | | | |
| 107-C-5 | | | .1396 | .0262 | 800 | 30,500 | 1150 | 43,900 | | | |
| 108-C-5 | | | .0990 | .0186 | 650 | 34,900 | 844 | 45,500 | | | |
| 110-C-5 | | | .1360 | .0255 | 645 | 25,300 | 923 | 36,200 | | | |
| AVERAGE | | | | | | 29,625 | | 40,300 | | | |

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE XIII BEARING TESTS

## 181 CLOTH - CLASS IV (828) RESIN

| SPECIMEN NO. | (1) ANGLE OF LOADING (DEGREES) | DIAMETER OF PIN (IN.) | GAGE (IN.) | AREA (IN²) | YIELD (2) (LBS.) | YIELD (2) STRESS (PSI) | ULTIMATE STR. (LBS) | ULTIMATE STR. (PSI) | TYPE FAILURE | TEST TEMP. (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| III-A-1 | 0 | .1875 | .1295 | .0243 | 875 | 36,000 | 1290 | 53,100 | BEARING | R.T. | |
| II2-A-1 | | | .1355 | .0254 | 750 | 29,500 | 1325 | 52,100 | | | |
| II3-A-2 | | | .1172 | .0220 | 875 | 39,800 | 1195 | 54,400 | | | |
| II4-A-1 | | | .1260 | .0236 | 800 | 33,800 | 1195 | 50,600 | | | |
| AVERAGE | | | | | | 34,775 | | 52,550 | | | |
| III-B-1 | 45 | | .1382 | .0259 | 850 | 32,800 | 1350 | 52,100 | | | |
| II2-B-1 | | | .1300 | .0244 | 910 | 37,300 | 1245 | 51,100 | | | |
| II3-B-1 | | | .1200 | .0255 | 830 | 32,500 | 1255 | 49,200 | | | |
| II4-B-1 | | | .1112 | .0209 | 950 | 45,500 | 1090 | 52,200 | | | |
| AVERAGE | | | | | | 37,025 | | 51,150 | | | |
| III-C-1 | 90 | | .1234 | .0231 | 760 | 32,900 | 1225 | 52,900 | | | |
| II2-C-1 | | | .1258 | .0236 | 690 | 29,200 | 915 | 38,800 | | | |
| II3-C-1 | | | .1147 | .0215 | 870 | 40,500 | 1170 | 54,400 | | | |
| II4-C-1 | | | .1245 | .0233 | 750 | 32,200 | 1135 | 48,700 | | | |
| AVERAGE | | | | | | 33,700 | | 48,700 | | | |
| III-A-2 | 0 | | .1270 | .0238 | 675 | 28,400 | 1120 | 47,100 | | | WET (3) |
| II2-A-2 | | | .1340 | .0251 | 875 | 34,900 | 1145 | 45,600 | | | |
| II3-A-1 | | | .1150 | .0216 | 750 | 34,600 | 990 | 45,800 | | | |
| II4-A-2 | | | .1099 | .0206 | 700 | 34,000 | 960 | 46,100 | | | |
| AVERAGE | | | | | | 32,975 | | 46,275 | | | |
| III-B-2 | 45 | | .1240 | .0233 | 750 | 32,200 | 1120 | 48,100 | | | |
| II2-B-2 | | | .1330 | .0249 | 840 | 33,700 | 1135 | 45,600 | | | |
| II3-B-2 | | | .1190 | .0223 | 825 | 37,000 | 1135 | 50,900 | | | |
| II4-B-2 | | | .1245 | .0233 | 610 | 26,200 | 1025 | 44,000 | | | |
| AVERAGE | | | | | | 32,275 | | 47,150 | | | |
| III-C-2 | 90 | | .1250 | .0234 | 750 | 32,100 | 1055 | 45,100 | | | |
| II2-C-2 | | | .1370 | .0257 | 820 | 31,900 | 1125 | 43,800 | | | |
| II3-C-2 | | | .1190 | .0223 | 880 | 39,500 | 1130 | 50,700 | | | |
| II4-C-2 | | | .1178 | .0221 | 725 | 32,800 | 1045 | 47,300 | | | |
| AVERAGE | | | | | | 34,075 | | 46,725 | | | |

(1) ANGLE BETWEEN LOAD AND WARP DIRECTION OF SPECIMEN

(2) STRESS AT WHICH BEARING HOLE WAS DEFORMED 4 % OF ITS ORIGINAL DIAMETER (.017")

(3) SOAKED IN BOILING DISTILLED WATER FOR 3 HRS. AND IMMEDIATELY TESTED AT ROOM TEMPERATURE

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE XIII (CONTD.) BEARING TESTS

## 181 CLOTH - CLASS IV (828) RESIN

| SPECIMEN NO. | (1) ANGLE OF LOADING (DEGREES) | DIAMETER OF PIN (IN.) | GAGE (IN.) | AREA (IN²) | YIELD (2) STRESS (LBS.) | YIELD (2) STRESS (PSI) | ULTIMATE STR. (LBS.) | ULTIMATE STR. (PSI) | TYPE FAILURE | TEST TEMP. (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 111-A-3 | 0 | .1875 | .1290 | .0242 | 385 | 15,900 | 530 | 21,900 | BEARING | 300 | SOAKED AT 300°F FOR 1/2 HR. |
| 112-A-3 | | | .1285 | .0241 | 420 | 17,400 | 580 | 24,100 | | | |
| 113-A-3 | | | .1240 | .0233 | 550 | 23,600 | 625 | 26,900 | | | |
| 114-A-3 | | | .1312 | .0246 | 370 | 15,000 | 570 | 23,200 | | | |
| AVERAGE | | | | | | 17,975 | | 24,025 | | | |
| 111-B-3 | 45 | | .1346 | .0252 | 330 | 13,100 | 475 | 18,800 | | | |
| 112-B-3 | | | .1240 | .0233 | 270 | 11,600 | 435 | 18,700 | | | |
| 113-B-3 | | | .1234 | .0231 | 645 | 27,900 | 685 | 29,600 | | | |
| 114-B-3 | | | .1185 | .0222 | 420 | 18,900 | 541 | 24,400 | | | |
| AVERAGE | | | | | | 17,875 | | 22,875 | | | |
| 111-C-3 | 90 | | .1350 | .0253 | 375 | 14,800 | 540 | 21,300 | | | |
| 112-C-3 | | | .1285 | .0241 | 475 | 19,700 | 645 | 26,800 | | | |
| 113-C-3 | | | .1232 | .0231 | 595 | 25,800 | 630 | 27,300 | | | |
| 114-C-3 | | | .1149 | .0215 | 330 | 15,300 | 546 | 25,400 | | | |
| AVERAGE | | | | | | 18,900 | | 25,200 | | | |
| 111-A-4 | 0 | | .1292 | .0242 | 645 | 26,700 | 750 | 31,000 | | | SOAKED AT 300°F FOR 100 HRS. |
| 112-A-4 | | | .1334 | .0250 | 635 | 25,400 | 790 | 31,600 | | | |
| 113-A-4 | | | .1154 | .0216 | 670 | 31,000 | 765 | 35,400 | | | |
| 114-A-4 | | | .1204 | .0226 | 570 | 25,200 | 677 | 30,000 | | | |
| AVERAGE | | | | | | 27,075 | | 32,000 | | | |
| 111-B-4 | 45 | | .1243 | .0233 | 510 | 21,900 | 660 | 28,300 | | | |
| 112-B-4 | | | .1218 | .0228 | 500 | 21,900 | 630 | 27,600 | | | |
| 113-B-4 | | | .1240 | .0233 | 590 | 25,300 | 770 | 33,100 | | | |
| 114-B-4 | | | .1210 | .0227 | 582 | 25,600 | 725 | 31,900 | | | |
| AVERAGE | | | | | | 23,675 | | 30,225 | | | |
| 111-C-4 | 90 | | .1256 | .0236 | 570 | 24,200 | 745 | 31,600 | | | |
| 112-C-4 | | | .1280 | .0240 | 495 | 20,600 | 605 | 25,200 | | | |
| 113-C-4 | | | .1126 | .0211 | 670 | 31,800 | 755 | 35,800 | | | |
| 114-C-4 | | | .1216 | .0228 | 530 | 23,200 | 651 | 28,600 | | | |
| AVERAGE | | | | | | 24,950 | | 30,300 | | | |

CONVAIR — FORT WORTH

TABULATION SHEET

## TABLE XIII (CONTD.) BEARING TESTS

### 181 CLOTH - CLASS IV (828) RESIN

| SPECIMEN NO. | (1) ANGLE OF LOADING (DEGREES) | DIAMETER OF PIN (IN.) | GAGE (IN.) | AREA ($IN^2$) | YIELD (2) (LBS.) | STRESS (PSI) | DEFORMATION AT FAILURE (IN.) | ULTIMATE STR. (LBS.) | ULTIMATE STR. (PSI) | TYPE FAILURE | TEST TEMP. (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 112-A-5 | 0 | .1875 | FAILED BEFORE | | | SPECIMEN HAD | | SOAKED 100 HRS. | | | | SOAKED AT 300°F WHILE STRESSED TO 20% OF ROOM TEMP. ULTIMATE STR. VALUE. |
| 113-A-5 | " | | " | | " | " | " | " | " | " | | |
| 111-A-5 | 0 | | .1280 | .0240 | 345 | 14,400 | | 425 | 17,700 | BEARING | 300 | SOAKED AT 260°F FOR 100 HRS. WHILE STRESSED TO 20% OF ROOM TEMP. ULTIMATE STR. VALUE |
| 112-A-6 | | | .1230 | .0231 | 632 | 27,300 | | 647 | 28,000 | | | |
| 114-A-5 | | | FAILED BEFORE SPECIMEN HAD SOAKED 100 HRS. | | | | | | | | | |
| AVERAGE | | | | | | 20,850 | | | 22,850 | | | |
| 111-A-6 | 0 | | FAILED BEFORE SPECIMEN HAD SOAKED 100 HRS. | | | | | | | | | |
| 112-A-6 | | | " | " | " | " | " | " | " | " | | |
| 112-A-8 | | | " | " | " | " | " | " | " | " | | SOAKED AT 260°F FOR 100 HRS. WHILE STRESSED TO 40% OF ROOM TEMP. ULTIMATE STR. VALUE. |
| 113-A-6 | | | .1147 | .0215 | 430 | 20,000 | | 450 | 20,900 | BEARING | 300 | |
| 114-A-6 | | | FAILED BEFORE SPECIMEN HAD SOAKED 100 HRS. | | | | | | | | | |
| 111-A-7 | 0 | | .1253 | .0235 | 133 | 5,600 | | 150 | 6,400 | BEARING | 500 | SOAKED AT 500°F FOR 1/2 HR |
| 112-A-7 | | | .1225 | .0230 | | | .0060 | 145 | 6,300 | | | |
| 113-A-7 | | | .1150 | .0216 | | | .0048 | 135 | 6,300 | | | |
| 114-A-7 | | | .1208 | .0227 | 142 | 6,300 | | 145 | 6,400 | | | |
| AVERAGE | | | | | | 5,950 | | | 6,350 | | | |
| 111-B-5 | 45 | | .1250 | .0234 | 160 | 6,800 | | 222 | 9,500 | | | |
| 112-B-5 | | | .1340 | .0251 | 125 | 5,000 | | 150 | 6,000 | | | |
| 113-B-5 | | | .1275 | .0239 | | | .0064 | 170 | 7,100 | | | |
| 114-B-5 | | | .1160 | .0218 | 130 | 6,000 | | 132 | 6,100 | | | |
| AVERAGE | | | | | | 5,933 | | | 7,175 | | | |
| 111-C-5 | 90 | | .1202 | .0225 | | | .0057 | 138 | 6,100 | | | |
| 112-C-5 | | | .1260 | .0236 | | | .0064 | 155 | 6,600 | | | |
| 113-C-5 | | | .1140 | .0214 | | | .0032 | 160 | 7,500 | | | |
| 114-C-5 | | | .1232 | .0231 | | | .0056 | 116 | 5,000 | | | |
| AVERAGE | | | | | | | | | 6,300 | | | |

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE XIV BEARING TESTS

## 143 CLOTH - CLASS II (4232) RESIN

| SPECIMEN NO. | (1) ANGLE OF LOADING (DEGREES) | DIAMETER OF PIN (IN.) | GAGE (IN.) | AREA ($IN^2$) | YIELD (LBS.) | STRESS (2) (PSI) | DEFORMATION AT FAILURE (IN.) | ULTIMATE STR. (LBS.) | ULTIMATE STR. (PSI) | TYPE FAILURE | TEST TEMP. (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 116-A-1 | 0 | .1875 | .1240 | .0233 | 635 | 27,300 | | 707 | 30,300 | BEARING | R.T. | |
| 117-A-1 | | | .1110 | .0208 | 605 | 29,100 | | 607 | 29,200 | | | |
| 118-A-1 | | | .1355 | .0254 | 675 | 26,600 | | 820 | 32,300 | | | |
| 119-A-1 | | | .1155 | .0217 | 510 | 23,500 | | 625 | 28,800 | | | |
| AVERAGE | | | | | | 26,625 | | | 30,150 | | | |
| 116-B-1 | 45 | | .1200 | .0225 | 480 | 21,300 | | 577 | 25,600 | SHEAR | | |
| 117-B-1 | | | .1170 | .0219 | 512 | 23,400 | | 635 | 29,000 | | | |
| 118-B-1 | | | .1212 | .0227 | 585 | 25,800 | | 635 | 27,900 | | | |
| 119-B-1 | | | .1115 | .0209 | 480 | 23,000 | | 555 | 26,600 | BEARING | | |
| AVERAGE | | | | | | 23,375 | | | 27,275 | | | |
| 116-C-1 | 90 | | .1150 | .0216 | 450 | 20,800 | | 555 | 25,700 | TENSION | | |
| 117-C-1 | | | .1160 | .0218 | 417 | 19,100 | | 421 | 19,300 | | | |
| 118-C-1 | | | .1185 | .0222 | 470 | 21,200 | | 485 | 21,800 | | | |
| 119-C-1 | | | .1091 | .0205 | 460 | 22,400 | | 544 | 26,500 | | | |
| AVERAGE | | | | | | 20,875 | | | 23,325 | | | |
| 116-A-2 | 0 | | .1247 | .0234 | 470 | 20,100 | | 590 | 25,200 | BEARING | 300 | SOAKED AT 300°F FOR 100 HRS. |
| 117-A-2 | | | .1110 | .0208 | 525 | 25,200 | | 575 | 27,600 | | | |
| 118-A-2 | | | .1295 | .0243 | 575 | 23,700 | | 650 | 26,800 | | | |
| 119-A-2 | | | .1165 | .0218 | 460 | 21,000 | | 592 | 27,200 | | | |
| AVERAGE | | | | | | 22,500 | | | 26,700 | | | |
| 116-B-2 | 45 | | .1172 | .0220 | 435 | 19,800 | | 465 | 21,100 | SHEAR | | |
| 117-B-2 | | | .1178 | .0221 | 375 | 17,000 | | 465 | 21,000 | | | |
| 118-B-2 | | | .1317 | .0247 | 500 | 20,200 | | 535 | 22,100 | | | |
| 119-B-2 | | | .1113 | .0209 | 360 | 17,200 | | 536 | 25,700 | BEARING | | |
| AVERAGE | | | | | | 18,550 | | | 22,475 | | | |
| 116-C-2 | 90 | | .1236 | .0232 | | | .0060 | 360 | 15,500 | TENSION | | |
| 117-C-2 | | | .1132 | .0212 | | | .0070 | 350 | 16,500 | | | |
| 118-C-2 | | | .1126 | .0211 | 350 | 16,600 | | 365 | 17,300 | | | |
| 119-C-2 | | | .1151 | .0216 | 270 | 12,500 | | 413 | 19,100 | | | |
| AVERAGE | | | | | | 14,550 | | | 17,100 | | | |

(1) ANGLE BETWEEN LOAD AND WARP DIRECTIONS OF SPECIMEN

(2) STRESS AT WHICH BEARING HOLE WAS DEFORMED 4% OF ITS ORIGINAL DIAMETER (.0075")

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE XIV (CONTD.) BEARING TESTS

## 143 CLOTH - CLASS II (4232) RESIN

| SPECIMEN NO. | (1) ANGLE OF LOADING (DEGREES) | DIAMETER OF PIN (IN.) | GAGE (IN.) | AREA (IN²) | YIELD STRESS (2) (LBS.) | (PSI) | ULTIMATE STR. (LBS.) | (PSI) | TYPE FAILURE | TEST TEMP (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 116-A-3 | 0 | .1875 | .1220 | .0229 | 550 | 24,000 | 624 | 27,200 | BEARING | 300 | SOAKED AT 300°F FOR 100 HRS. WHILE STRESSED TO 20% OF ROOM TEMP ULTIMATE STR. VALUE |
| 117-A-3 | ↓ | ↓ | .1110 | .0208 | 503 | 24,200 | 543 | 21,090 | ↓ | ↓ | ↓ |
| 118-A-3 | ↓ | ↓ | .1290 | .0242 | 642 | 26,500 | 663 | 27,400 | ↓ | ↓ | ↓ |
| 119-A-3 | ↓ | ↓ | .1070 | .0201 | 420 | 20,900 | 514 | 25,600 | ↓ | ↓ | ↓ |
| AVERAGE | | | | | | 23,900 | | 26,550 | | | |
| 116-A-4 | 0 | ↓ | .1174 | .0220 | 560 | 25,400 | 654 | 29,700 | ↓ | ↓ | SOAKED AT 300°F FOR 100 HRS. WHILE STRESSED TO 40% OF ROOM TEMP. ULTIMATE STR VALUE |
| 117-A-4 | ↓ | ↓ | .1100 | .0206 | 560 | 27,200 | 575 | 27,900 | ↓ | ↓ | ↓ |
| 118-A-4 | ↓ | ↓ | .1290 | .0242 | 620 | 25,600 | 667 | 27,600 | ↓ | ↓ | ↓ |
| AVERAGE | | | | | | 26,066 | | 28,400 | | | |
| 116-A-5 | 0 | ↓ | .1218 | .0228 | 450 | 19,700 | 540 | 23,600 | ↓ | 500 | SOAKED AT 500°F FOR ½ HR. |
| 117-A-5 | ↓ | ↓ | .1114 | .0209 | 400 | 19,100 | 513 | 24,600 | ↓ | ↓ | ↓ |
| 118-A-5 | ↓ | ↓ | .1304 | .0245 | 530 | 21,600 | 575 | 23,500 | ↓ | ↓ | ↓ |
| 119-A-5 | ↓ | ↓ | .1145 | .0215 | 295 | 13,700 | 349 | 16,200 | ↓ | ↓ | ↓ |
| AVERAGE | | | | | | 18,525 | | 21,975 | | | |
| 116-B-3 | 45 | ↓ | .1203 | .0226 | 337 | 14,900 | 410 | 18,200 | SHEAR | | |
| 117-B-3 | ↓ | ↓ | .1172 | .0220 | 300 | 13,600 | 414 | 18,800 | BEARING | | |
| 118-B-3 | ↓ | ↓ | .1320 | .0248 | 315 | 12,700 | 440 | 17,800 | SHEAR | | |
| 119-B-3 | ↓ | ↓ | .1062 | .0199 | 280 | 14,000 | 353 | 17,700 | BEARING | | |
| AVERAGE | | | | | | 13,925 | | 18,125 | | | |
| 116-C-3 | 90 | ↓ | .1217 | .0228 | 310 | 13,600 | 330 | 14,500 | TENSION | | |
| 117-C-3 | ↓ | ↓ | .1109 | .0208 | 270 | 13,000 | 341 | 16,400 | BEARING | | |
| 118-C-3 | ↓ | ↓ | .1268 | .0238 | 335 | 14,100 | 335 | 14,100 | TENSION | | |
| 119-C-3 | ↓ | ↓ | .1135 | .0213 | 340 | 16,000 | 296 | 13,900 | BEARING | | |
| AVERAGE | | | | | | 14,175 | | 14,725 | | | |

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE (2) XV BEARING TESTS

## 143 CLOTH - CLASS III (506) RESIN

| SPECIMEN NO. | (1) ANGLE OF LOADING (DEGREES) | DIAMETER OF PIN (IN.) | GAGE (IN.) | AREA ($IN^2$) | DEFORMATION AT FAILURE (IN.) | ULTIMATE STR. (LBS.) | ULTIMATE STR. (PSI) | TYPE FAILURE | TEST TEMP. (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|
| 121-A-1 | 0 | .1875 | .0950 | .0178 | .0056 | 495 | 27,800 | BEARING | R.T. | |
| 122-A-1 | | | .0920 | .0173 | .0056 | 509 | 29,400 | | | |
| 123-A-1 | | | .1000 | .0188 | .0056 | 591 | 31,400 | | | |
| 124-A-1 | | | .0990 | .0186 | .0052 | 534 | 28,700 | | | |
| AVERAGE | | | | | | | 29,325 | | | |
| 121-B-1 | 45 | | .0970 | .0182 | .0060 | 507 | 27,900 | SHEAR | | |
| 122-B-1 | | | .0910 | .0171 | .0056 | 444 | 26,000 | | | |
| 123-B-1 | | | .0950 | .0178 | .0056 | 476 | 26,700 | | | |
| 124-B-1 | | | .1020 | .0191 | .0066 | 478 | 25,000 | | | |
| AVERAGE | | | | | | | 26,400 | | | |
| 121-C-1 | 90 | | .0990 | .0186 | .0028 | 288 | 15,500 | TENSION | | |
| 122-C-1 | | | .0912 | .0171 | .0044 | 410 | 24,000 | | | |
| 123-C-1 | | | .0950 | .0178 | .0037 | 368 | 20,700 | | | |
| 124-C-1 | | | .1030 | .0193 | .0048 | 409 | 21,200 | | | |
| AVERAGE | | | | | | | 20,350 | | | |
| 121-A-2 | 0 | | .0885 | .0166 | .0032 | 475 | 28,600 | BEARING | 300 | SOAKED AT 300°F FOR 100 HRS. |
| 122-A-2 | | | .0944 | .0177 | .0066 | 450 | 25,400 | | | |
| 123-A-2 | | | .0973 | .0182 | .0056 | 495 | 27,200 | | | |
| 124-A-2 | | | .0912 | .0171 | .0064 | 520 | 30,400 | | | |
| AVERAGE | | | | | | | 27,900 | | | |
| 121-B-2 | 45 | | .0976 | .0183 | .0056 | 435 | 22,100 | SHEAR | | |
| 122-B-2 | | | .0913 | .0171 | .0051 | 400 | 23,400 | | | |
| 123-B-2 | | | .0952 | .0179 | .0062 | 440 | 24,600 | | | |
| 124-B-2 | | | .1000 | .0188 | .0051 | 400 | 21,300 | | | |
| AVERAGE | | | | | | | 22,850 | | | |
| 121-C-2 | 90 | | .1006 | .0189 | .0038 | 300 | 15,900 | TENSION | | |
| 122-C-2 | | | .0907 | .0170 | .0054 | 325 | 19,100 | | | |
| 123-C-2 | | | .0965 | .0181 | .0040 | 285 | 15,700 | | | |
| 124-C-2 | | | .0990 | .0186 | .0048 | 259 | 13,900 | | | |
| AVERAGE | | | | | | | 16,150 | | | |

(1) ANGLE BETWEEN LOAD AND WARP DIRECTIONS OF SPECIMEN.

(2) YIELD STRESS OMITTED BECAUSE FAILURE OCCURRED BEFORE BEARING HOLE WAS DEFORMED 4% OF ITS ORIGINAL DIAMETER. (.0075")

CONVAIR — FORT WORTH

TABULATION SHEET

## TABLE (2) XV (CONTD.) BEARING TESTS

### 143 CLOTH – CLASS III (506) RESIN

| SPECIMEN NO. | (1) ANGLE OF LOADING (DEGREES) | DIAMETER OF PIN (IN.) | GAGE (IN.) | AREA ($IN^2$) | DEFORMATION AT FAILURE (IN.) | ULTIMATE STR. (LBS.) | (PSI) | TYPE FAILURE | TEST TEMP. (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|
| 121-A-3 | 0 | .1875 | .0965 | .0181 | .0058 | 389 | 21,500 | BEARING | 500 | SOAKED AT 500°F FOR ½ HR. |
| 122-A-3 | ↓ | ↓ | .0887 | .0166 | .0048 | 356 | 21,400 | ↓ | ↓ | ↓ |
| 123-A-3 | ↓ | ↓ | .1003 | .0188 | .0060 | 428 | 22,800 | ↓ | ↓ | ↓ |
| 124-A-3 | ↓ | ↓ | .0962 | .0180 | .0066 | 405 | 22,500 | ↓ | ↓ | ↓ |
| AVERAGE | | | | | | | 22,050 | | | |
| 121-B-3 | 45 | ↓ | .0982 | .0184 | .0068 | 351 | 19,100 | SHEAR | ↓ | ↓ |
| 122-B-3 | ↓ | ↓ | .0865 | .0162 | .0056 | 318 | 19,600 | ↓ | ↓ | ↓ |
| 123-B-3 | ↓ | ↓ | .1018 | .0191 | .0068 | 364 | 19,100 | ↓ | ↓ | ↓ |
| 124-B-3 | ↓ | ↓ | .0985 | .0185 | .0068 | 365 | 19,800 | ↓ | ↓ | ↓ |
| AVERAGE | | | | | | | 19,400 | | | |
| 121-C-3 | 90 | ↓ | .0998 | .0187 | .0044 | 275 | 14,700 | TENSION | ↓ | ↓ |
| 122-C-3 | ↓ | ↓ | .0865 | .0162 | .0044 | 253 | 15,600 | ↓ | ↓ | ↓ |
| 123-C-3 | ↓ | ↓ | .0975 | .0183 | .0040 | 241 | 13,200 | ↓ | ↓ | ↓ |
| 124-C-3 | ↓ | ↓ | .0970 | .0182 | .0056 | 322 | 14,700 | ↓ | ↓ | ↓ |
| AVERAGE | | | | | | | 15,300 | | | |

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE XVI BEARING TESTS

## 143 CLOTH - CLASS IV (828) RESIN

| SPECIMEN NO. | (1) ANGLE OF LOADING (DEGREES) | DIAMETER OF PIN (IN.) | GAGE (IN.) | AREA ($IN^2$) | YIELD (2) STRESS (LBS.) | YIELD (2) STRESS (PSI) | DEFORMATION AT FAILURE (IN.) | ULTIMATE STR. (LBS.) | ULTIMATE STR. (PSI) | TYPE FAILURE | TEST TEMP. (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 126-A-1 | 0 | .1875 | .1150 | .0216 | | | .0043 | 795 | 36,800 | BEARING | R.T. | |
| 127-A-1 | | | .1280 | .0240 | 725 | 30,200 | | 848 | 35,300 | | | |
| 128-A-1 | | | .1250 | .0234 | | | .0070 | 545 | 23,300 | TENSION | | |
| 129-A-1 | | | .1170 | .0219 | | | .0048 | 515 | 23,500 | | | |
| AVERAGE | | | | | | | | | 29,725 | | | |
| 126-B-1 | 45 | | .1340 | .0251 | 650 | 25,900 | | 940 | 37,500 | SHEAR | | |
| 127-B-1 | | | .1310 | .0246 | 785 | 31,900 | | 790 | 32,100 | | | |
| 128-B-1 | | | .1290 | .0242 | 750 | 31,000 | | 855 | 35,300 | | | |
| 129-B-1 | | | .1170 | .0219 | 745 | 34,000 | | 865 | 39,500 | | | |
| AVERAGE | | | | | | 30,700 | | | 36,100 | | | |
| 126-C-1 | 90 | | .1230 | .0231 | | | .0068 | 590 | 25,500 | TENSION | | |
| 127-C-1 | | | .1240 | .0233 | | | .0056 | 530 | 22,700 | | | |
| 128-C-1 | | | .1340 | .0251 | 800 | 31,900 | | 865 | 34,500 | BEARING | | |
| 129-C-1 | | | .1180 | .0221 | 755 | 34,200 | | 915 | 41,400 | | | |
| AVERAGE | | | | | | | | | 31,525 | | | |
| 126-A-2 | 0 | | .1189 | .0223 | 385 | 17,300 | | 500 | 22,400 | | 300 | SOAKED AT R.T. |
| 127-A-2 | | | .1245 | .0233 | 350 | 15,000 | | 510 | 21,900 | | | FOR 1/2 HR. |
| 128-A-2 | | | .1320 | .0248 | 295 | 11,900 | | 350 | 14,100 | TENSION | | |
| 129-A-2 | | | .1176 | .0221 | 235 | 10,600 | | 340 | 14500 | | | |
| AVERAGE | | | | | | 13,700 | | | 18,225 | | | |
| 126-B-2 | 45 | | .1262 | .0237 | 260 | 11,000 | | 425 | 17,900 | SHEAR | | |
| 127-B-2 | | | .1320 | .0248 | 420 | 16,900 | | 450 | 18,100 | | | |
| 128-B-2 | | | .1300 | .0244 | 400 | 16,400 | | 465 | 19,100 | | | |
| 129-B-2 | | | .1258 | .0236 | 495 | 21,000 | | 530 | 22,500 | BEARING | | |
| AVERAGE | | | | | | 16,325 | | | 19,400 | | | |
| 126-C-2 | 90 | | .1253 | .0235 | 240 | 10,200 | | 325 | 13,800 | TENSION | | |
| 127-C-2 | | | .1270 | .0238 | 270 | 11,300 | | 315 | 13,200 | | | |
| 128-C-2 | | | .1372 | .0257 | 415 | 16,100 | | 550 | 21,400 | BEARING | | |
| 129-C-2 | | | .1233 | .0231 | 275 | 11,900 | | 400 | 17,300 | | | |
| AVERAGE | | | | | | 12,375 | | | 16,425 | | | |

(1) ANGLE BETWEEN LOAD AND WARP DIRECTIONS OF SPECIMEN.

(2) STRESS AT WHICH BEARING HOLE WAS DEFORMED 4% OF ITS ORIGINAL DIAMETER (.0075")

Page 103

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE XVII BEARING TESTS

## 120 CLOTH — CLASS II (4232), III (506), AND IV (828) RESINS

| SPECIMEN NO. | TYPE RESIN | (1) ANGLE OF LOADING (DEGREES) | DIAMETER OF PIN (IN.) | GAGE (IN.) | AREA ($IN^2$) | YIELD (2) STRESS (LBS.) | YIELD (2) STRESS (PSI) | ULTIMATE STR. (LBS.) | ULTIMATE STR. (PSI) | TYPE FAILURE | TEST TEMP. (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 131-A-1 | 4232 | 0 | .1875 | .1300 | .0244 | 612 | 25,100 | 747 | 30,600 | TENSION SHEAR | R.T. | |
| 132-A-1 | | | | .1170 | .0219 | 664 | 30,300 | 866 | 39500 | ↓ | ↓ | |
| 133-A-1 | | | | .1250 | .0234 | 500 | 21,400 | 647 | 27,600 | BEARING | | |
| 134-A-1 | | | | .1240 | .0233 | 650 | 27,900 | 903 | 38,800 | TENSION SHEAR | | |
| AVERAGE | | | | | | | 26,175 | | 34,125 | | | |
| 131-A-2 | | | | .1290 | .0242 | 420 | 17,400 | 561 | 23,200 | BEARING | 500 | SOAKED AT 500°F. |
| 132-A-2 | | | | .1180 | .0221 | 330 | 14,900 | 403 | 18,200 | | | FOR ½ HR. |
| 133-A-2 | | | | .1145 | .0215 | 410 | 19,100 | 580 | 27,000 | | | |
| 134-A-2 | | | | .1250 | .0234 | 465 | 19,900 | 622 | 26,600 | | | |
| | | | | | | | 17,825 | | 33,750 | | | |
| 136-A-1 | 506 | | | .1176 | .0221 | 750 | 34,000 | 981 | 44,500 | BEARING | R.T. | |
| 137-A-1 | | | | .1150 | .0216 | 772 | 35,800 | 892 | 41,400 | TENSION | | |
| 138-A-1 | | | | .1150 | .0216 | 630 | 29,200 | 929 | 43,100 | | | |
| 139-A-1 | | | | .1130 | .0212 | 750 | 35,400 | 922 | 43,500 | | | |
| AVERAGE | | | | | | | 33,600 | | 43,125 | | | |
| 141-A-1 | 828 | | | .1133 | .0212 | 670 | 31,600 | 895 | 42,100 | BEARING | R.T. | |
| 142-A-1 | | | | .1264 | .0237 | 650 | 27,400 | 860 | 36,600 | | | |
| 143-A-1 | | | | .1364 | .0256 | 730 | 28,500 | 890 | 34,800 | TENSION | | |
| 144-A-1 | | | | .1069 | .0200 | 635 | 31,800 | 990 | 49,400 | TENSION SHEAR | | |
| AVERAGE | | | | | | | 29,825 | | 40,725 | | | |

(1) ANGLE BETWEEN LOAD AND WARP DIRECTIONS OF SPECIMEN.
(2) STRESS AT WHICH BEARING HOLE WAS DEFORMED 4% OF ITS ORIGINAL DIAMETER (.0075)

CONVAIR — FORT WORTH

TABULATION SHEET

# TABLE XVIII BEARING TESTS

## 183 CLOTH - CLASS II (4232), III (506) AND IV (828) RESINS

| SPECIMEN NO. | TYPE RESIN | (1) ANGLE OF LOADING (DEGREES) | DIAMETER OF PIN (IN.) | GAGE (IN.) | AREA (IN²) | YIELD STRESS (2) (LBS.) | YIELD STRESS (2) (PSI) | ULTIMATE STR. (LBS.) | ULTIMATE STR. (PSI) | TYPE FAILURE | TEST TEMP (°F) | CONDITION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 146-A-1 | 4232 | 0 | .1875 | .1240 | .0233 | 645 | 27,700 | 798 | 34,200 | BEARING | R.T. | |
| 147-A-1 | | | | .1200 | .0225 | 710 | 31,600 | 797 | 35,400 | | | |
| 148-A-1 | | | | .1190 | .0223 | 622 | 27,900 | 679 | 30,400 | | | |
| 149-A-1 | | | | .1225 | .0230 | 560 | 24,300 | 756 | 32,900 | | | |
| AVERAGE | | | | | | | 27,875 | | 33,225 | | | |
| 146-A-2 | | | | .1280 | .0240 | 420 | 17,500 | 491 | 20,500 | | 500 | SOAKED AT 500°F. FOR 1/2 HR. |
| 147-A-2 | | | | .1135 | .0213 | 395 | 18,500 | 440 | 20,700 | | | |
| 148-A-2 | | | | .1180 | .0221 | 395 | 17,900 | 423 | 19,100 | | | |
| 149-A-2 | | | | .1190 | .0223 | 395 | 17,700 | 444 | 19,900 | SHEAR | | |
| AVERAGE | | | | | | | 17,900 | | 20,050 | | | |
| 151-A-1 | 506 | | | .1185 | .0222 | 875 | 39,400 | 1130 | 50,900 | BEARING | R.T. | |
| 152-A-1 | | | | .1178 | .0221 | 830 | 37,600 | 1030 | 46,600 | | | |
| 153-A-1 | | | | .1159 | .0217 | 800 | 36,900 | 1025 | 47,200 | | | |
| 154-A-1 | | | | .1194 | .0224 | 825 | 36,800 | 915 | 40,900 | | | |
| AVERAGE | | | | | | | 37,675 | | 46,400 | | | |
| 156-A-1 | 828 | | | .1160 | .0218 | 820 | 37,600 | 1085 | 49800 | BEARING | R.T. | |
| 157-A-1 | | | | .1170 | .0219 | 810 | 37,000 | 1025 | 46,800 | | | |
| 158-A-1 | | | | .1170 | .0219 | 800 | 36,500 | 1070 | 48,900 | | | |
| 159-A-1 | | | | .1130 | .0212 | 800 | 37,700 | 980 | 46,200 | | | |
| AVERAGE | | | | | | | 37,200 | | 47,925 | | | |

(1) ANGLE BETWEEN LOAD AND WARP DIRECTIONS OF SPECIMEN
(2) STRESS AT WHICH BEARING HOLE WAS DEFORMED 4% OF ITS ORIGINAL DIAMETER (.0075")

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